the JOURNAL of the Travellers' Aid Society

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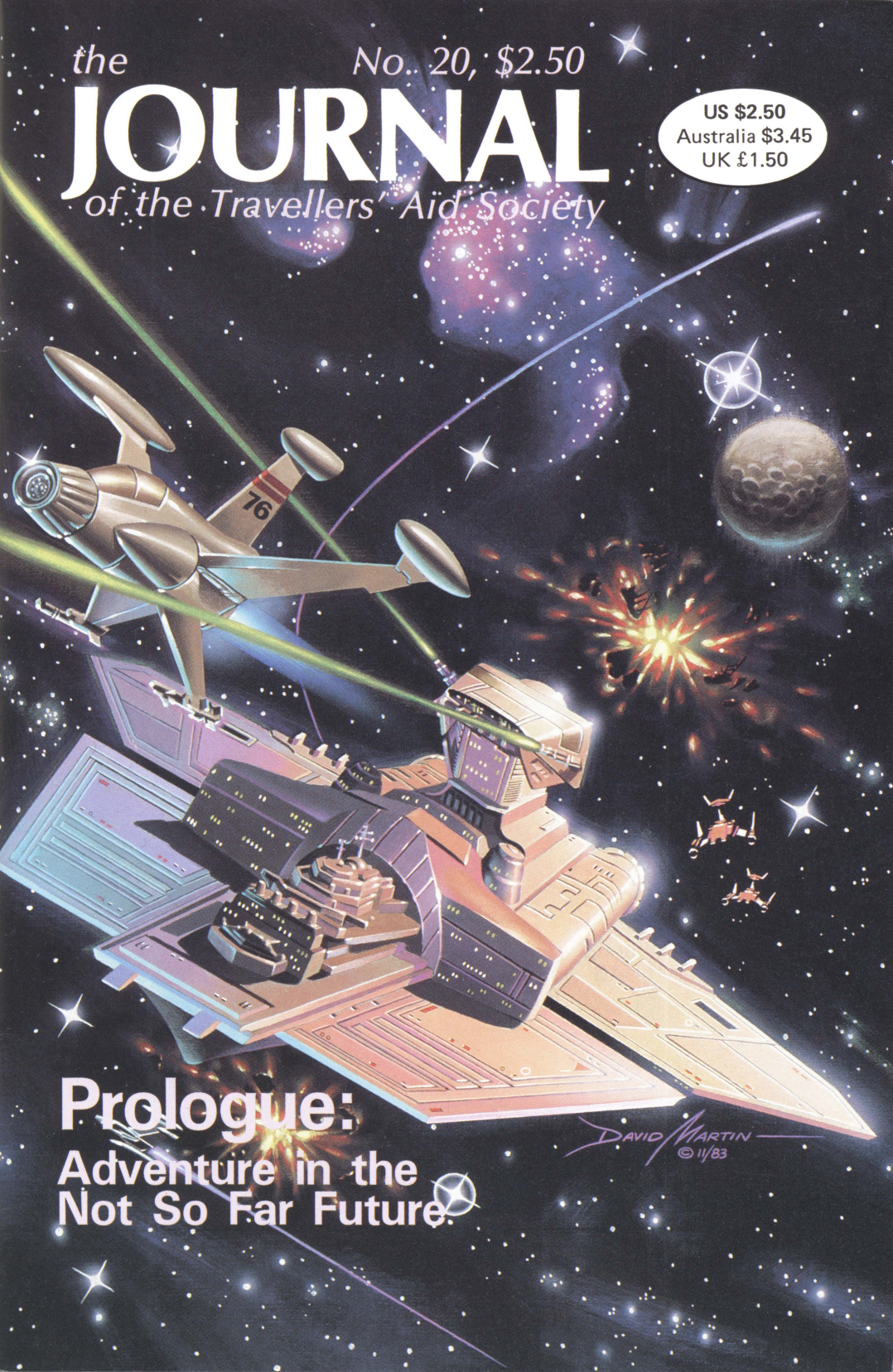

Prologue:
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JOURNAL

of the Travellers' Aid Society®

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The *Journal of the Travellers' Aid Society* is Game Designers' Workshop's registered trademark for its science fiction gaming magazine devoted to **Traveller.**

Traveller is Game Designers' Workshop's registered trademark for its role-playing game of science fiction adventure set in the far future.

Dates in this issue of the *Journal* are given in accordance to an arbitrary Imperial calendar of 365 days. The date consists of a three-digit day number (the current day of the year) a dash, and a four digit number (showing the current year since the founding of the Imperium).

The date of this issue is **100-1110**, or the 100th day of the 1110th year of the Imperium.

The *Journal of the Travellers' Aid Society* is a science fiction magazine devoted to **Traveller**, GDW's role-playing game set in the far future.

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WINNER — H. G. WELLS AWARD: BEST MAGAZINE COVERING ROLE-PLAYING, 1979, 1980, 1981

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Advertisers should inquire for an advertising rate card.

Submissions: We welcome articles and illustrations for the **Journal**. Please inquire before submitting manuscripts, enclosing a stamped, self-addressed envelope; we will send manuscript guideline and format sheets. Foreign inquiries (except APO/FPO) please include International Reply Coupon.

From the Management

Regular readers will notice that this issue of the *Journal* is following upon the heels of the last one rather more closely than usual. This is part of my attempt to get back onto something resembling our old schedule.

This issue is the *Journal's* special Aslan issue. It didn't start out that way, but a number of factors conspired to make it such. When Andrew Keith finished working on *Alien Module 1, Aslan* for GDW, he found he had quite a bit of material which could not be included in that package for various reasons. He rewrote these slightly, and submitted them as part of the Aslan package. At almost the same time, we received several other Aslan articles (one or two of them by a couple of Andy's associates), and I decided to run them in the *Journal* closest to the planned release date of the module (it was too late to announce this on the cover, since these are made up several months in advance). This led me to another brilliant idea: Since GDW will be releasing other alien modules at about quarterly intervals, why not run special alien issues for each of them as well? So, for the next year or so, whenever there is an Alien module released, the *Journal* will run additional material on that particular alien race. The cover paintings, however, will not necessarily match up with the contents. For instance, next issue, #21, will feature the K'kree, and will roughly coincide with the release of *Alien Module 2, K'kree.* The cover for #21, however, will feature Vargr. The reason for this is rather complex, and I will explain it only as a means of illustrating how the Workshop functions.

I must commission cover paintings quite some time in advance of the issue upon which they will appear. There are several reasons for this. First, a cover must be done in time for a smaller version of it to appear in the *Next Issue* announcement on page 48 of the issue before. Further, this smaller version must be done at the same time the four-color process separations are made (for economic reasons), which means that the painting must be sent off to the separators well in advance of the publication date of the *Journal* it appears on. Add to this the time it takes for the artist to paint it, shipping time back and forth, and it totals up to almost six months. Six months ago, I commissioned a Vargr article from Andrew Keith which was slated to appear in #21. For issue 21, I also bought a painting from Bill Keith, featuring the Vargr. By the time I had decided to do the special alien features (see above) it was too late to do anything about the cover (which is why the special K'kree issue of the *Journal* will feature Vargr on the cover painting) and the Vargr issue will have something else entirely.

I hope this isn't too confusing to you all.

In another matter, Starman Adventure Systems of Heidelberg, Australia have been so kind as to donate a number of their latest "approved for use with **Traveller**" product, *The 4518th Lift Infantry Badge Pack.* These contain one Imperial starburst patch for the left sleeve, a Regina shoulder flash, and a 4518th Lift Infantry badge patch for the right shoulder, as well as insructions for wearing the patches, and a diagram of the supplemental warm climate uniform details. As a special bonus, provision is made to register you (or your character) with the regimental archives.

After keeping a few for office use (working here does have some perks!), there are still four left over, and I've decided to give them away to four readers of the *Journal* (or at least to readers of *From the Management).* If you are interested, send a post card (or a 3" x 5" card or piece of paper) with your name and address to "Journal Patch Drawing", C/O GDW, PO Box 1646, Bloomington, IL 61702-1646. On August 1, 1984 (to give you plenty of time to enter, especially if you live overseas) we will dump the cards in a box and draw four winners. Please enter only once. If you're not interested, don't send anything.

It's approaching summer, and the convention season will rapidly be upon us again. The pre-convention rush is in full swing as I write this. As usual, GDW will be attending several conventions this year. As the plans now stand, Marc Miller and I will be giving seminars at *Origins 84* in Dallas, Texas (June 21-24), *Atlanticon* in Baltimore, Maryland (August 3-5), and *Gencon XVII* in Kenosha, Wisconsin (August 16-19). GDW will be exhibiting at all these conventions, and other members of the staff will be putting on seminars and events, of course. If you happen to be in the neighborhood, stop in and see us.

Issue 19 "feedbacked "as follows:

AZ: Pride of Lions	4.30
AZ: Small Package	3.50
Gerontology	3.01
Ecology of Piracy	3.94
Animal Handling Skills	3.70
Parachutes	3.48
Skyport Authority	3.94
TNS Revisited	3.58
Scouts Errata	4.00
Martial Arts	4.12
From the Management	3.35
Just Detected	2.77
Traveller News Service	4.00
Bestiary: Lozin	3.06
Casual Encounter: M. Shom	3.12
Issue 19 as a Whole	3.90

GDW products (including **Traveller)** are available through distributors in the following countries:

Japan: GDW products are imported and distributed by Hobby Japan Co., LTD, 26-5, 5-Chome, Sendagaya, Shibuya-Ku, Tokyo, Japan. Some titles are translated into Japanese.

Italy: GDW products are imported and distributed by Pacific Enterprise Italia, Via R. Di Lauria, 15, Milano, Italy.

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Australia: GDW products are imported and distributed by Jedko Games, 18 Fonceca St, Mordialloc, Vic.

JUST DETECTED

CONVENTIONS

Gameathon 9

May 25-27, 1984, Schenectady, New York. Role-playing and assorted tournaments, conducted for the benefit of the Hospice of Schenectady. For more information contact R. C. Jones, SWA Gameathon, 1639 Eastern Parkway, Schenectady, NY 12309.

Earthcon IV

September 7-9, 1984, Cleveland, Ohio. Science Fiction/Gaming Convention sponsored by the North East Ohio Science Fiction Association. Guests of the con include Poul Anderson and Steve Jackson. Tournaments, boardgames, open gaming, plus gaming workshops and panels as well as an SCA demo and other events. For further information write Earthcon IV, PO Box 5641, Cleveland, OH 44101.

Summercon 84

July 27-29, at the MIT student Center, Cambridge, Massachusetts. Featuring FRP, Boardgames, and miniatures. Door and event pizes awarded. For information write Summercon 84, 122 Bowdoin St, Apt 77, Boston, MA 02108.

Gamex 1984

June 15-17, Chapman College, Orange, California. Fantasy and SF RPGs, boardgames, miniatures, family games. For information write Gamex 1984, PO Box 2577, Anaheim, CA 92804.

PLAY-AIDS

The Drenslaar Quest

One of Gamelords' licensed **Traveller** adventures, requiring the party to salvage a sunken starfreighter, complicated by hostile locals.

One 60 page, 5 1/2" x 8 1/2" booklet.

Design: William H. Keith, Jr.

Publisher: Gamelords, LTD., 18616 Grosbeak Terrace, Gaithersburg, MD 20879.

The Mountain Environment

Another in Gamelords' "Environment" series of licensed supplements, this one covering travel and adventure in mountainous terrain. The booklet covers equipment, unique hazards, special events, encounters and adventure ideas.

One 48 page, 5 1/2" x 8 1/2" booklet.

Design: J. Andrew Keith.

Publisher: Gamelords, LTD., 18616 Grosbeak Terrace, Gaithersburg, MD 20879.

Disappearance on Aramat

An approved adventure module for **Traveller**, published by Grenadier. A father hires the adventurers to discover what happened to his daughter, who was last seen as part of an archeological expedition to a supposedly uninhabited world.

One 8 1/2" x 11" booklet.

Design: Gary Pilkington.

Publisher: Grenadier Models, Inc., PO Box 305, Springfield, PA 19064.

TRAVELLER NEWS SERVICE

RHYLANOR/RHYLANOR (0306-A434934-F) Date: 010-1110

¶ Admiral Lord Santanocheev, former commander of Imperial forces during the current hostilities, is reported by unofficial sources to have requested a formal board of inquiry into the reasons for his recent relief.

¶ The details of the Admiral's relief from command remain unknown, as do the exact whereabouts of the Admiral himself. Ω

RHYLANOR/RHYLANOR (0306-A434934-F) Date: 023-1110

¶ After months of speculation by informed observers, the Admiralty revealed today that a major operation to relieve Jewell has been undertaken by combined Imperial and Colonial forces.

¶ No further data is available. Ω

RHYLANOR/RHYLANOR (0306-A434934-F) Date: 039-1110

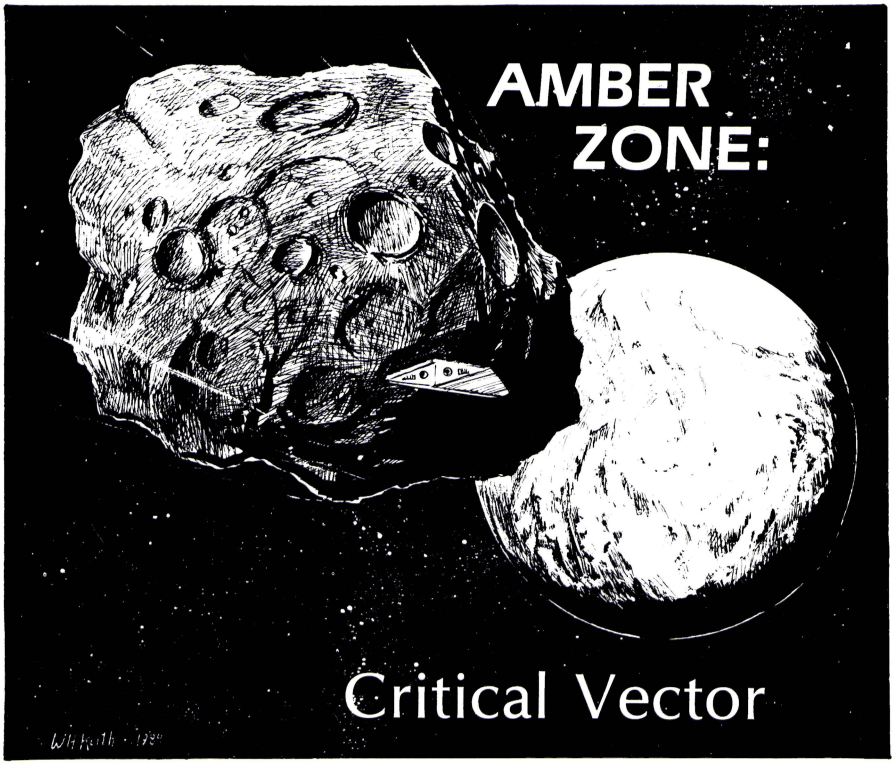
¶ The public relations office of the Imperial Navy refused to deny or to confirm rumors of Zhodani atrocities against citizens of Ruby and Emerald during the recent occupation of those worlds. Ω

FLASH FLASH FLASH FLASH FLASH FLASH FLASH FLASH FLASH
QUAR/CHRONOR (0808-B532720-B) Date 99-1110

¶ In a joint press release, the Zhodani Consulate and the Imperial Admiralty announced that an armistice is in effect as of 120-1110 Imperial reckoning. All hostilities are to cease, and all belligerents are to remain in their positions as of the above date.

¶ The press release went on to announce that negotiations for the cessation of hostilities have begun on Quar. Imperial officials declined to comment further on the announcement. Ω

Traveller News Service is another Imperium-wide benefit of membership in the Travellers' Aid Society.



Players' Information

When the adventurers' ship dropped out of jump space into the Vendetierre system, the reception was a bit out of the ordinary. Instead of the usual inward orbital clearances, initial radio queries brought a jumble of confused and desperate messages with a single theme, a plea for help.

Vendetierre (C-759685-8) is rather off the beaten path, infrequently visited by regular merchant or passenger carriers. It was this fact which had brought the adventurers to the system, carrying a special cargo of computer components for a Vendetierran plant which was expected to begin production within a few weeks, and could not afford to wait for the next scheduled cargo vessel.

Gradually, the situation became clearer as the adventurers neared the planet. Just one week before, the system's local naval spacewatch discovered an asteroid, previously uncharted, falling insystem from high out of the ecliptic. Early projections and computer analysis revealed chilling news; the millions-to-one-against chance had come up, and the fifty kilometer wide rock would smash into Vendetierre in ten day's time.

The system's naval forces had consisted of two ancient corvettes—all the peaceful backwater system had needed for customs and patrol duties. Both had been immediately dispatched to the asteroid, and their last radio transmission indicated that they had matched vectors with the target and were in the process of closing to within a few hundred meters. Then both ships had vanished in a fireball easily visible to observers on Vendetierre.

By disastrously bad luck, there were

no other ships on Vendetierre at the time. Unless some way can be found to divert or destroy the incoming mountain of rock, the Vendetierran civilization and millions of people are doomed. The sudden and unexpected appearance of the adventurers' ship only days before zero-hour had brought a surge of new hope that something might yet be done in time.

Referee's Information

Panic has gripped Vendetierre, and the adventurers will have trouble getting either cooperation or any sense out of the world's officials. The bureaucracy which rules the planet is unable to find a single voice for itself, much less maintain order among a population gone berserk. However, the adventurers will be repeatedly offered any reward they care to name if they will help in some way. Dozens of rich and powerful people are trying to outbid one another for passenger space on the only starship within two parsecs. A few more reasonable voices point out that a large enough explosion on or in the asteroid while it is far enough away from the planet should divert it enough so that it will miss Vendetierre completely.

The adventurers will have several options open to them in this escapade. The simplest, of course, is that they take some of those rich people up on their offers and transport them off Vendetierre in exchange for a few million credits each. Should the adventurers decide on this course, the referee should not make things easy for them. There will be panic wherever they land, and any attempt to take on a few select passengers will result in wild riots and attempts by rampaging mobs to enter and take over the ship (attempts which will almost inevitably result in the destruction of the ship).

The best chance for all concerned is to divert or destroy the asteroid before it collides with Vendetierre. This can be done in one of the following ways.

Missile Attack: If the adventurers' ship carries missiles, these may be fired at a carefully calculated point on the asteroid's surface. The referee should secretly roll 1D for each missile fired, add up the total, and compare the result with the time to impact table (see below). The closer the asteroid is to Vendetierre, the more points must be accumulated in order to destroy or divert it.

Explosives: If the adventurers have explosives, or if they can procure them while on the planet, these may be planted on or within the approaching asteroid and detonated from a distance. The referee rolls 1D on the table, with a DM +1 for every ton over two tons planted. Missile warheads may be included, and count as one ton for every six warheads used in this way. As shown by the table, there is a better chance for success if the adventurers can find a deep crevasse or cave on the asteroid and plant the explosives there. Finding the cave will take 1D+1 hours of surveying from the ship, followed by 1D hours of exploration by the crew using vacc suits. It will take 1D hours (rolled one time and used as a constant throughout the escapade) for two people to unload one ton of explosives, carry them to the blast site, and emplace them. Each additional two-person team working can carry an additional ton in that time. The referee should have each player make periodic throws of 10+ to avoid accidents while working in vacc suits, with a DM+4 for each level of vacc suit expertise. This is particularly important if it has been determined that the explosives must be placed at the bottom of a deep cavern or crevasse in the asteroid's surface. If the adventurers happen to have a thermonuclear device aboard, its implantation and detonation

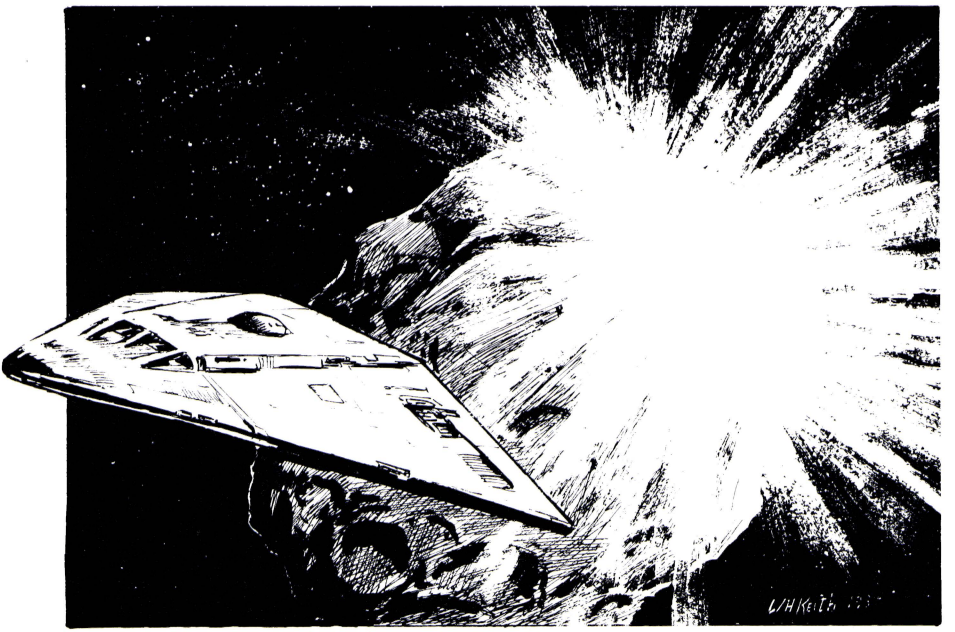
are carried out as if it were equivalent to the rating (in megatons or kilotons) in conventional explosives.

The closer the asteroid is to Vendetierre, the harder it will be to turn it aside. The 96 hours left before impact are divided into eight 12-hour periods. The referee will be responsible for keeping a careful watch on the countdown, and for determining how much time the adventurers lose travelling to and from the target, dealing with bureaucrats on Vendetierre, and taking care of such mundane necessities as eating and sleeping. The adventurers may elect to go without food and sleep, but the referee should reflect their subsequent losses of efficiency through modified die rolls. Weariness causes people to make mistakes.

Travel Times: The asteroid is 10,368,000 km away from Vendetierre 96 hour before the impact, travelling about 30 kps, or 108,000 kph (actually, the asteroid will gain speed as it comes closer to the world, but these figures represent an average the referee can use without becoming bogged down in mathemetical calculations).

Fragmentation: There is a chance that the asteroid will fragment into many pieces each time an explosion is set off on or under its surface. Each time an attempt is made, the referee should roll 2D, with a DM+1 for each attempt already made. The asteroid will shatter on a roll of 11+ if the blast is on the surface, 9+ if it is in a cavern or crevasse. If the result is one less than the roll needed for fragmentation (10 or 8 exactly), the asteroid will split into two large halves and myriad pieces of smaller rubble. If the asteroid has *not* been diverted by the attempt, both halves will hit Vendetierre at zero hour, creating as much (or more) devastation as the single body would have. Further attempts may be made to divert or fragment both pieces, if time remains. A single piece hitting Vendetierre would still be a catastrophe, but at that point, the adventurers would be working towards minimizing the disaster, not averting it.

Fragmentation may mean success. If



it occurs while the asteroid is still at least two days from the world (5 or more 12-hour periods), dispersal of the fragments will result in most of them missing the planet or burning up in the atmosphere. The few which reach the ground will cause comparatively little damage. If fragmentation occurs when the asteroid is two days away, but the results on the table indicate that it was successfully diverted, most of the pieces will miss the world, and those which do hit will cause no damage.

If the asteroid breaks up less than two days from the planet but has not been diverted, most of the pieces will still hit. Fortunately, small pieces burn up faster than big ones, and more of the asteroid's mass will be vaporized when it hits atmosphere. Enough large fragments will survive to cause extensive damage and flooding, however. There will be loss of life in most of these cases, but the results will be far less severe than would have been the case had the asteroid hit as a single mountain of nickle-iron!

Multiple Attacks: The adventurers may discover that they must make several attempts to destroy the oncoming asteroid. The referee is responsible for keeping track of damage already inflicted on the target. The total number of damage points inflicted by a previous missile attack is divided by ten, any decimal fraction is dropped, and the result used as a positive DM in future attacks. In attempts using explosives, each damage point over 6 may count as DM+1 in subsequent attacks. These point values are cumulative and add up through successive attempts.

Complications: Each time the adventurers land on Vendetierre, they will be in danger from mobs desperate to escape the planet. Government forces may be on hand to help protect the adventurers and their ship, but the disintegration of both local and planetary government will accelerate as zero-hour approaches. It will be necessary to land however, to get explosives or rearm with missiles. The referee must decide how much time is lost during each trip loading explosives, avoiding or fighting crowds, and haggling with unreasonable, confused, panicky bureaucrats.

Afterwards: If the adventurers are successful, they will receive great rewards. The population will greet them with wild adulation. The referee should temper this reward depending upon the degree of success and the actual damage to the world. It is possible that some portion of the population will hold considerable animosity towards the group if a partially successful mission results in severe damage to only a portion of Vendetierre.

— *William H. Keith, Jr.*

Time to Impact Table

Periods Remaining:	*Missile Attack Total:*	*Surface Explosion:*	*Sub-surface Explosion:*	*Fusion Explosion:*
8	36	7+	5+	3+
7	48	8+	6+	4+
6	60	9+	7+	5+
5	90	10+	8+	6+
4	160	12+	10+	7+
3	—	13+	11+	8+
2	—	—	12+	10+
1	—	—	13+	11+
4 hrs or less	—	—	—	12+

The Ways of Kuzu

ASLAN PHILOSOPHIES

I am Aslan, a warrior of Hoaaw-li'ukhtai, of the clan Afaikhiyoi. I was born on Kuzu (as humans say it), the place of coming, in the city of U'khai-of-the-Red-Dawn. As the third eldest of my family's sons, the shape of my way was directed from my earliest days; I took the Ah'ukhtai, the "Vow of Heroes," and rose through the ranks to become Leader of Clansmen of a mercenary battle group, Kaha a'huye, the brotherhood of the Rose-Tinged Waters. I have spent many years in the company of humans, and have a better understanding of their ways than most of my people.

There is an old and venerable saying that the true differences between peoples lie within. I am not human, but Aslan. The difference lies not in my form, but within my *eaia,* my inner self, my heart (as some humans might translate it). It long puzzled me, when I first met those of humaniti, that some should expect me to act and react as they; that they should think me, in some twisted-fang way, as a human in mask and furred costume.

It is certain that humans and Aslan will

fare together in their quests across the galaxy, and understanding—and *taro* in full on both hands—is necessary if that faring is to be for good, and not ill. It was for this reason that a human friend, a *huweihwoweiy,* bade me write this, that understanding between our peoples be increased. My friend promised to give what I had written to a friend of his, who would make it known to large numbers of humaniti by means of this Journal.

Perhaps humans must always label what they do not understand with concepts familiar to them (I am told this is called by your scholars "anthropomorphization," a word which I have never been able to pronounce). Upon hearing that Aslan "meditate," they assume the custom has some religious significance, and assume the devotees to be somehow other-worldly, removed from the thoughts and strivings of existence.

Nothing could be farther from the truth.

THOUGHTS SHAPE THE WAY

Ai yourhai is the first precept, the guiding philosophy of all of my people. Its name might be translated roughly as "thoughts shape the way," a concept that surrounds and nurtures all Aslan grounded in their mother culture.

The symbol of ai yourhai is the Aslan hand with fighting claw extended. The Aslan's slashing fighting claw extends when it is needed without conscious thought, seemingly of its own volition, because he is what he is. The concept of ai yourhai states that the Aslan mind can be so ordered, so strengthened, that proper actions always spring from trained and proper thinking. This, in fact, is the purpose of meditation among Aslan, to discipline and harden the mind, that actions—the strike of arm and extended claw—be automatic and unerring. This meditation—concentration in private for a time each day on deeds, writings, and litany chains of abstract thoughts—serves to sharpen concentration and senses, eliminate the tendency to distraction, and prepare the body to respond to whatever demands may be made upon it.

"Right thinking leads to right action" one human writer described it, and it would be hard to improve upon those words. It must be remembered, however, that the Aslan warrior does not dwell on the concept, but simply pursues it, for he does so knowing that thinking is not doing, as doing is not achieving.

THE COMPANY OF HEROES

Ukhtai eaiawehi—"company of heroes"—is a difficult concept for humans, a belief that we are surrounded by a vast and unseen throng of those who have gone before. It is not, as so many human xenosophontologists insist, ancestor or spirit worship, or even a belief in ghosts (if I use that word properly), though it is likely that the notion had its origin in such beliefs thousands of years ago. Aslan today do not believe in literal ghosts, but rather in the *eaia,* which might be translated as "genius" or perhaps "embodied ideal." While the eaia cannot be said to have any actual being outside of its psychological reality within the Aslan mind, it is usually referred to as an external presence.

Ukhtai eaiawehi teaches us not to abandon our comrades under any circumstances, for we would be abandoned by the Unseen Company, an inner banishment more lonely, more rending than any mere physical exile. If one's eaia cannot take it's place with the Great Company, then there is no place for it in the cosmos, and no place for that Aslan with his people.

THE SHRINE OF HEROES

The "Shrine of Heroes" is the closest thing to a place of worship for Aslan.

One can be found on nearly every ship, each military encampment, every place where Aslan are gathered; even each household has a family shrine for meditation and remembrance. The Shrine of Heroes is a quiet and private place for personal meditation on the deeds, words, and persons of Aslan heroes. Relics or images called *ahfa* are kept there; frequently 3-D sight and sound recordings of special individuals can be projected there for inspiration and instruction.

The Shrine of Heroes is a beautiful place, close, silent, hung with tapestries or velvet curtains to exclude sound, and decorated with scenes of battle or triumph. It is never large, for meditations are expected to be private. Before battle, a military shrine will have a line of personnel waiting to use it for a precious few minutes, for it is thought that one's skill and battle prowess is increased a thousand-fold if he enters battle with his mind cleared and sharpened by the discipline of meditation, his arm guided by the purpose of right thinking. Most Aslan carry their own ahfa in a small pouch or chest, to be used especially when a shrine of heroes is not available. Ahfa may be medallions, statuettes, scrolls (detailing heroic deeds), a tuft of plant material or lump of soil from a battlefield, anything which may serve as a focus of meditation by reminding the warrior of his own deeds and those of his family and clan. A warrior's ahfa are considered to be—if not secret, at least best kept private, things to be shared only with the closest of comrades.

WITH US IN SPIRIT

Aslan stress the purity of culture and philosophy which makes Aslan what they are. It is for this reason that Aslan culture has remained remarkably stable and unchanging across thousands of worlds where we have settled, even where we have been thrown into close contact with alien ideas and concepts.

Huweihwoweiy might be translated as "with us in spirit," and means that a person or a people act according to the highest ideals of our philosophy. It is not a title lightly bestowed, for it brings with it responsibility for a serious trust. The only higher honor is formal adoption into an Aslan clan group—a ceremony which occurs rarely, in extraordinary circumstances.

The term huweihwoweiy can be applied to any (Aslan or non-Aslan) who strive or suffer or share with Aslan as brothers, who help them in need, who do not desert them in danger or trouble, who stand by them and willingly identify with them as of the People. Huweihwoweiy can join any groups—families or clan prides, towns or cities, even worlds with common goals and a shared direction.

ANATHEMA

There are some things which no Aslan in his right mind would do. This is, perhaps, an oversimplification; Aslan are as diverse in their individual ways of thinking and behavior as are humans. But these particular acts are rare among the Aslan because the way they think shapes the way they act—Ai yourhai.

Murder—that is, assassination without a formal challenge; abandoning a comrade in danger or in need; exchanging the life of others for one's own safety; blackening a good name; running from a challenge; these are the deeds called *rukhta,* a word perhaps best translated as "anathema" or "cursed," although I have seen it rendered as "crimes of honor" by some human writers.

There are several *hoaawli,* or "schools" of behavior, which demand greater attention to duty, which place greater demands on the individual. Usually these are associated with war-

rior groups, and center about a secret creed or oath known only to initiates. Most of these add additional rukhta to the common list; these may include such deeds as unneedful cruelty in a kill, unneedful challenge for personal satisfaction or lust for triumph, profaning one's own ai with unworthy thoughts, and a difficult word for humans, *rukhtiywe.*

When humans say that cowardice is unknown among the Aslan, they speak the truth. There literally is no word in any of our languages for this concept "cowardice," which few of us understand perfectly, even those of us who have long associated with humans. The closest word in Aslan might be *rukhtiywe;* there is no easy counterpart in any human tongue with which I or my friend am familiar, but the word embodies the concept of denying one's own Aslan-ness—one's heritage, family, and self, and as such is certainly rukhta.

The bond of huweihwoweiy is shattered by rukhta, and many hrurastea (blood quests) are launched by individual Aslan seeking to clear their names of the taint of rukht by finding and challenging the actual doer of some dark deed. Modern customs do not admit to trial by death-challenge and combat, but the practice is a common one nonetheless. The idea of formal challenge, followed by potentially mortal combat is deeply rooted in our society.

IT COMES

Tarohaka literally means "the water that flows without being forced," and the philosophy of *taro* ("it comes") is considered a virtue among Aslan, for patience can be the greatest weapon a hunter possesses. Humans have a proverb, "all things come to him who waits," and this is one of the few human sayings fully understood by those of our people who hear it. Taro is sharpened by meditation, and is thought of as a constant struggle against the dark nature of Aslan prehistory and id. The ancient call within us calls for us to strike now, and kill—but taro counsels patience, for the perfect time will reveal itself, and the strike will be sure, and the kill clean.

This is a particularly powerful image for Aslan warriors; the imagery evoked for us is the patient flowing of a trickle of water, which in the course of years smooths jagged rocks to pebbles, and over eons carved out vast canyons. Many Aslan keep as ahfa a small stereograph of Ka'htesu or of some other spectacular canyon or water carved rock formation in the badlands of Kuzu, a reminder of the power of taro. Others find the same understanding in a water-worn pebble from the bank of a stream.

The concept of adventuring—going forth as travellers in search of riches, recognition, victory—is well known to Aslan. Senior sons take upon themselves the title and land of family; it is left to younger sons to venture forth and carve new holdfasts from new worlds, and that carving is the stuff of adventure, the ai of new generations of heroes.

CONCLUSION

Many humans see in Aslan a likeness of a beast credited in your mythology with great strength, wisdom, and courage. Aslan see in humans a resemblance to a beast, common in our legends as a shrewd, clever trickster. Neither of us should be guided by myths.

You who would be huweihwoweiy to your Aslan comrades, understand what drives them, understand their eaia, their personal heart of hearts, that they seem not strange, but huweihwoweiy-in-human-terms; not human, but brothers.

— *Leader-of-clansmen Raearu'he KhaheakUkhtaikheHoaawlikhe Ukhtai* as told to *William H. Keith, Jr., of Scotia*

Temperature in **Traveller**

a Scouts *Variant*

With the publication of Book 6, *Scouts,* **Traveller** has entered into the realm of "hard" science fiction, allowing would-be Poul Andersons and Hal Clements to (among other things) create worlds in intricate and loving detail. Everything from the stellar type to the arrangement of gas giants, planets, and planetoid belts in the system is taken into account. Among many other things, this includes a method of calculating the surface temperature of worlds through the use of stellar luminosity, orbital radius, albedo, and greenhouse effect data.

Such calculations require a certain amount of dedication, but can lend a great deal of atmosphere and interest to the adventures undertaken on a particular planet. This article will show how temperature information can be made to work for you, and what you can do to apply this material to your **Traveller** adventures.

PRELIMINARIES

For this discussion, we presume you have access to Book 6 and to a calculator (essential to the *use* of Book 6 when such data as temperatures are to be computed). If you don't have Book

6, it is still possible to apply the information from this article; just pick a starting "mean surface temperature" and go from there.

One note, for the benefit of those of you who lack sufficient scientific background and who found (as I did) that your handy almanac doesn't include information on the temperature Kelvin scale: to get °C from °K, subtract 273.15. (*Editor's note: The first printing of Book 6 listed criteria for orbit zones in Kelvin. This should have been Centigrade, as the second printing and the errata in the last issue noted.)*

FINDING TEMPERATURES

The *Scouts* book gives formulas for finding a basic temperature figure for any world, or you can simply choose one. In either event, it is then possible to use this figure to compute temperature changes for any combination of circumstances (seasonal variations, latitudinal changes, day and night, even strange things like eccentric orbits and twilight zone worlds).

The Basic Temperature: The basic figure arrived at from Book 6 represents an average temperature at 40° latitude north or south of the equator on any particular world. Why that specific locale? Because the formula yields a value of about 15°C for earth, and 15° is found as an average temperature around the 40° latitude band. *Scouts* determined its formula specifically to yield that temperature, so we will certainly use that in preference to restructuring our basic formulas.

Latitudinal Changes: As one moves towards or away from the equator, temperatures change with the changed angle of the sun's rays through the atmosphere. The changes grow sharper as the latitude increases. To determine these changes, determine the latitude for which a temperature is needed, and apply these basic changes.

Towards the equator, +1°C for every 5° change in latitude from the 40° baseline (up to +8°C).

Towards the poles, −1.5°C *per degree* change in latitude from the 40° baseline (up to −74°C).

Apply these changes to the basic temperature originally derived, for a new base temperature for the new latitude.

These changes apply to an earth-sized planet; for planets of differing size, take the size digit (R) and multiply the rate of temperature change given by R/8. Thus, on a world of size 4, the equator would be +40°C temperature, and the poles about −38°C (somewhat less extreme due to the smaller sizes involved). Fractions may be rounded to the nearest whole number.

Axial Tilt: Scouts presents a good, rough-and-ready way to determine the effects of axial tilt on seasonal variations. This produces fairly acceptable ranges for earthlike worlds around a G-class star, but, unfortunately, doesn't work as well for the other spectral types, since the percentages are again much more pervasive when working with extremes of luminosity. For a more precise variation for seasonal temperature differences, apply the following procedure:

Summer: +0.6°C per ° of axial inclination of the world.

Winter: −1°C per ° of axial inclination of the world.

These can alter our basic temperature (at 40° latitude), or they can alter our temperature derived at a specific latitude; it amounts to the same thing. *However,* seasonal variations do *not* occur in the tropics (the area between T° north and south of the equator, where T is the inclination of the world). Axial inclination variations are not affected by world size.

Orbital Eccentricity: It is best to ignore this whole question, except when work-

ing on a planet with a truly eccentric orbit.

Altitude: We can now determine a basic summer and winter temperature for any point on the globe. If, however, our locale is on a significantly elevated part of the planet (say, a mountain or a plateau), the phenomenon known as "lapse rate" comes into play. Temperature decreases at a rate of 1° per 200 meters above "surface level" (sea level on worlds with oceans, an arbitrary determination of the referee's on other worlds). Thus, a point 1 kilometer above surface level is 5° colder than a point at surface level, on the average.

Water: The presence of a significant body of water alters the temperature somewhat. Water will reduce temperatures in areas near it (say, within 5 km) in the summer by 1-6°C, and raise them a like amount within the same area in winter. The same is true of day and night temperature variations as well, since water cools more slowly than land, and retains heat at night, but heats more slowly in the day. Thus, the same 1-6° variations modify the day and night changes, as discussed below.

Day and Night: During the day, the temperature will vary from the basic temperature for the latitude in question. This is largely based on the atmosphere of the planet, since denser atmospheres retain more heat. The world's atmosphere rating is added to the basic temperature each day. Each night, 15°-atmosphere rating is subtracted from the basic temperature. Near water, a 1-6° modifier is subtracted by day and added by night.

Local Variations: Regardless of the

atmosphere of the world, some locations will experience local variations. A desert, for instance, will tend to have less heat retention at night than a smog-bound city. The referee may wish to assign modifiers to temperature changes, based on such considerations. Areas at a higher altitude will have a lower pressure (see my supplement *The Mountain Environment* published by Gamelords Ltd. for a detailed treatment) which can change the modifiers applied. Any such variations may be applied at the discretion of the referee.

Random Variations: Not even the best meteorologists get every prediction right. The various temperature calculations above only yield some basic considerations of temperature ranges; various essential extremes will occur, pushing temperatures up and down. Since the contributing factors are much too complex to state in any simple rule, we will leave determination of these variations to the individual referee.

Twilight Zone Worlds: A world which is tidally locked to its sun (rotating at such a speed that it constantly presents the same face to the star) is frequently referred to as a twilight zone world. The name arises from the presence of a band encircling the globe from pole to pole at which the star will always appear to be on or near the horizon. The daylight side of the planet will be constantly exposed to the sun and (since tidally-locked worlds are usually that way because of the close proximity of the star) is usually very, very hot. Temperature drops off sharply, however, and it is possible that the world's twilight zone region will be habitable even if temperatures are too high to allow life on the dayside. The nightside temperatures fall off equally drastically, and a world with a scorched desert to sunward can have a frozen wasteland opposite where perpetual night reigns.

To calculate the effects of temperature on such a world, we can make use of a polite fiction that will work marvelously well. Assume that the temperature generated from Book 6 is that found on a particular part of the dayside. To be exact, we pretend that the point on the world closest to the star is 0°, and we set up concentric circles, as if of latitude, around this point. The 90° line corresponds to the rim of this circular cross section of the world—the twilight zone band falls here. Our Book 6 temperature is for the 40° latitudinal band on a normal world. Temperatures rise towards the 0° point in the same manner as for the equatorial band, and fall towards the 90° band at the same 1.5° rate as on a normal world as we head towards the poles. The temperature drops at the same rate of 1.5° per ° of "latitude" as we move from the twilight zone to the nightside, ending at a 180° point exactly opposite the 0° mark on the dayside. Use the formula given for latitude changes to compute different temperature drops for different sized worlds.

A tidally-locked world's axial inclination may be taken into account in exactly the same way as a normal world's would. Temperatures are raised and lowered in summer and winter in regions outside the "tropics" (see above). Remember that the north latitude's winter is the south latitude's summer, and vice versa. Other temperature effects for worlds in a tidal lock conform to those for normal worlds.

Multiple-star Systems: Binary and trinary systems present interesting extra problems in the determination of temperature. A close binary system is no problem, since the two stars are almost touching. Just add their luminosities together to determine the total luminosity received by the planet. When the companion star(s) are comfortably (several

thousand AUs) distant, there's no problem at all. But stars can occupy other orbits in the system, and can subject the world to considerable variations in temperatures.

To see just how much variation occurs, use the information given in *Scouts* to determine the square root of the distance in AUs from the planet to the common star at closest approach, average separation and furthest separation. Divide these values into $L^{.25}$, the companion's luminosity to the 1/4 power (this can be calculated by finding the square root of the square root of L) to produce three numbers. The middle one, the average distance figure, is then divided into each of the other two, giving a ratio of the relative luminosity of the star from each of these three distances (the middle distance has a ratio of 1:1).

Now temperatures can be calculated for each of the three points in the companion star's travels. The luminosity of the central star has a constant, but is increased by a varying amount as the companion moves in its orbit. At the average distance, the two luminosities are added together and plugged into the formula. At the closest approach or furthest separation, the appropriate ratio is multiplied by the companion star's luminosity to give the relative luminosity of the star; *this* value is added to the constant luminosity of the central star instead. (It is as if the companion was at a constant single distance and varying its output—the only way the equation using a single distance can be used.) This gives us a range of temperatures which may vary considerably, depending on the size and distance of the companion star.

Calculating the period with which these changes occur is difficult, and can best be done by establishing a rough chart to determine the relative motions of the companion star and the world in their orbits. Determine the period of each, and approximate distances travelled on the chart until you see how frequently closest and furthest separations occur. This becomes the period of the temperature changes.

It should be noted that a tidally locked world in an orbit closer to the primary than the companion's orbit will experience some interesting problems when the companion is at closest approach. The nightside will for a time receive heat and light (calculate as if the companion were tidally-locked on the nightside during the period in question, using the notes for twilight zone worlds). The dayside will be unaffected, the nightside will suddenly have its temperature established by the new star, and the twilight zone temperature will be the sum of what is received from both directions. If there is a significant hydrosphere on the nightside (ice), and the temperature is high enough to melt this ice, fierce storms will come boiling out of the nightside, causing havoc to the whole planetary ecosystem.

HOW TO USE TEMPERATURE

Above all else, temperature calculations give a sense of local color. It is a never-ending struggle to remind players that they are on an alien world, and climate is one good way to do this. A world of high temperatures can remind us of a desert, tropical, or jungle setting (depending on other factors), while a bitterly cold world will recall ice planets and similar situations (beware of falling into the "raining on the planet Mongo" syndrome by having the whole world's climate be the same). Survival techniques in different climates will vary considerably (as the series of environmental supplements I have written for Gamelords vividly demonstrate). We can expect different societies, different architecture, different customs, and different ways of life to be found in different climates.

Climate can restrict the usable land area of a world, explaining an occasional low population figure for an otherwise lovely planet. (Maybe only the equatorial band or a twilight zone is actually comfortable). These and other areas of background and color can be provided and expanded upon when you take a world's temperatures into account. For an example, see Boxed Module 1, *Tarsus.*

There are specific adventure applications, of course. The twilight zone world provides fascinating possibilities for excursions into regions of great climatic extremes. Temperature considerations allow us to more vividly realize that a world is a big place, with many variations in local conditions. On a single world, a band of adventurers can experience an excursion across the polar icecap, a cruise of a tropical archipelago, a journey across an arid desert, or a Chicago winter—source for a great variety in adventures even when the group is limited to a single world for a time.

Exactly how you use planetary temperatures depends on you. The rules and possibilities in **Traveller** exist; it is up to you to use them as you will.

A NOTE ON MAPPING

When using the standard **Traveller** planetary map, one hex is equal to 8° of latitude. Thus, the 40° latitude line runs about five hexes from the equator, north and south. The temperature in any specific hex can be calculated once the 40° line is known.

To simplify things, twilight zone maps should be mapped so that the line which is the equator on normal maps is the twilight zone, with the top of the map representing sunward, and the bottom the nightside. If this is done, an equator should be drawn in (two lines, spaced 18 hexes apart, running from top to bottom). The north pole should be spaced midway between the two lines of the equator, on the centerline of the map. When drawn this way, latitude lines (run-

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Adventures in Traveller:

Trade and Commerce

Sooner or later in the career of the typical **Traveller** referee, a group of adventurers is going to stumble across the rules pertaining to trade and commerce. When this happens, nine times out of ten the referee is fated to watch the familiar forms of these players change with the inevitability of a werewolf under the full moon as they become consumed with the overriding urge to become merchant princelings of deep space.

The Nicholas van Rijn bug will strike almost everyone sooner or later. Some get over it fairly soon, and go back to being devil-may-care mercenaries, happily quoting muzzle velocities and rates of fire and never giving a second thought to cargo and brokerage rates. But others never recover; they can be recognized by their battered calculators worn down by frequent percentile comparisons, by the hands clenched from rolling dice for cargos, and, above all, from the look of pure, unadulterated greed gleaming in their eyes as they recite that favorite question, "What types of cargos can we pick up here?"

The referee, though, faces a much harder set of questions. How does one keep up a series of exciting adventures while the players want to spend all their time buying and selling cargo? What approaches exist to limit their growing wealth (without intervening too bluntly), in order to avoid having them become multi-millionaires who don't give a hoot about adventuring any more? These and connected questions will be the subject of this discussion, as the problems associated with exploratory adventures were covered in the previous entrant in

this series of articles.

COMMERCE AND ADVENTURE

Groups which carry cargo and passengers for hire are, of course, engaged in commerce, but the rules are rather carefully balanced to make it very difficult to make much of a profit. Even if there are no bank payments to be made on the ship, maintenance, life support, fuel, supplies, major repairs, and similar expenses drain off a large part of the revenues that are earned, making it necessary for the group to take occasional "adventuring" jobs to make ends meet. Keeping the party in need of money is a solid foundation upon which **Traveller** adventures frequently rest. Why else would the group risk life and limb, if not for personal gain? (There *are* other good motivations, but greed is most common and can be most readily identified with!)

Enter the rules on speculative trade. These rules permit the characters to start with some seed money (which they can almost always raise), and, with a little care, turn it into a fortune. This is not to say that they cannot lose their shirts while engaged in speculation, but players with even a handful of smarts will plan their routes to suit their cargo, and maximize their profit potential. More often than not, such characters will be turning a profit, which can quickly snowball through further careful planning.

Moreover, those players who go about the process right will have a tendency to focus on speculation to the exclusion of all else. If this happens, the referee may find himself spending more time regulating speculation die rolls than he does in administering an adventure or campaign. There are some ways to deal with this, however. The options that are open can be used to suit circumstances, and need not be exclusive of any other option. Ideally, most or all of these approaches should be used at one point or another in an ongoing campaign to keep things moving along.

GO WITH THE FLOW

The first option is also the simplest. Let the adventurers have their way. This is best done when they first get involved in speculation, and kept up until things get ridiculous. Actually, trade and speculation is a good transitional ploy to break up adventures. After all, the group can't face death and destruction every day of their lives—and they can't save the galaxy eight times a week (twice on Sundays). So a little intermittent commerce serves as a good way of earning a breathing spell. While it lasts, rebuild the finances, find useful items of equipment or information as they travel, and not really realize that they aren't doing anything. The referee can use the same time to start preparing a new adventure situation to spring on the group later on.

Indeed, commercial travelling can be turned to the referee's advantage. Properly handled, he can use it to lead the players by the nose to some specific destination. To do this, the referee must be the one to make all the trade and speculation table die rolls (and in secret) and must be willing to ignore some results in favor of results that will further the cause.

Let's look at District 268 in the Spinward Marches as an example. The adventurers have a far trader and start at Mertactor, at the end of the trade routes in from the Glisten subsector of the Imperium. The referee has plans for an adventure involving asteroid mining using the module *BeltStrike!* as a basis, set in the Bowman asteroid belt eight parsecs away. Now a patron might ordinarily be used to charter the ship for a flight to Bowman, but a more subtle way to get the group there is through

manipulation of the trade rules.

The adventurers start with a little money to invest, but they want to make a profit through trade and speculation. The referee ponders, pretends to randomly create a cargo, and announces that the cargo is of steel—inexpensive, available in quantity, and with a particularly high resale value on a poor world. Talos, one jump away, just happens to be poor.

At Talos, they sell the steel (hopefully at a profit). They find a load of farm machinery; looking at their options, they see that Tarkine, one week away, will pay them well for such machinery. At Tarkine, the cargo found might be mechanical parts or computer parts, which can be bought there for a low price, and sold for a profit on a non-industrial world. Here they have three options as to destination—Binges, Forine, or Flexos. To help them decide, the referee weights the odds by planting a rumor that a large number of petrochemical cargos have been shipped from Flexos recently. This should encourage the players to voyage *there.*

At Flexos, the promised cargo proves not to be available. There are, however, rumors of a rich strike in the Bowman system. There might also be a patron, who could charter the ship to carry supplies to the system to help outfit a mining expedition. In this way, the players have made exactly the same voyage they would have made if they had been hired back at Mertactor, but they've made some money while doing it and have felt themselves in complete control of their destinies at all times, although the referee has, in reality, been directing every step of their travels.

Speculative trade can be used to generate adventures locally, too. An example is found in *The Traveller Adventure.* The metal-bearing wood of a tough Pysadian tree is discovered to be of great value on neighboring worlds of the Aramis subsector. None of the wood is available at the port, but is is possible to harvest some directly. This lures the party out of the protection of the extrality fence of the starport and into the jurisdiction of the religious dictatorship which rules Pysadi, and sets the stage for an adventure which may have some far-reaching future implications.

Thus, in these terms, the referee may use the trade and commerce rules in a judicious manner to produce a needed set of results. What about those times when trade and commerce is interfering with normal adventuring? There are always possibilities.

THE FICKLE FINGER OF FATE

Characters can lose their shirts by buying high and selling low, although, as we have seen, this can be minimized by sound planning. For instance, players can never go very wrong by hiring a +4 broker, since the broker generally adds 40% to their profit while taking only 20% of the sale price. This is always a good deal. So the characters will probably be making money if they are even a little bit smart about how they operate.

The referee, however, has options also, being in control of the "slings and arrows of outrageous fortune." When a group starts ignoring adventure possibilities, or looks like it might amass enough money to upset the campaign, then it's time for fate to take a hand.

Consider the various possibilities open to the referee. The adventurers might run across a crooked broker who swindles them out of a sizable amount of money. They might have most of their operating capital tied up in a cargo of gems when pirates show up to hijack the loot. They might knowingly or unknowingly violate a local customs regulation, causing confiscation of the cargo or even their ship. Their starship could suffer a malfunction

or a breakdown that costs the group most of its ready capital to repair.

Such events can have many purposes. First, they can knock out unreasonably large profits and keep the group struggling to earn a living. That's useful. Second, it helps keep the players humble. Perhaps in the future they won't tie up all their assets into something that can vanish at a single stroke. Forcing them to diversify will keep them from snowballing their assets quite so fast.

Finally, these options lead squarely back into the realm of adventuring, and that's where the action is in **Traveller**. They may take it in mind to track down the crooked broker or the pirates. The customs office may propose restoration of ship and cargo in exchange for completion of some hazardous mission. The breakdown may be at a particularly embarrassing moment when the results could be really drastic for all concerned. It's up to the referee to be the balance wheel for the flow of the campaign, creating obstacles with one hand and opportunities with the other.

It should never become a standard policy to take away the money the characters have earned without giving them a chance to do something about it. Players don't like to see their money vanish without their being able to put up a fight. This can be good motivation to keep them involved in exciting adventures, and the act of recovering a lost investment may *legitimately* cut down their profits to a manageable level.

MERCHANT PRINCES

There is a final course of action that a referee should be willing to explore. This is to allow the players to make the fortune they seek (and to keep it), but to run things in such a way as to set the stage for adventures of a new and unusual type. Here the object is to let the player characters build up a small commercial concern of their own, and then run it.

As profits from small scale speculation begin to mount, the referee can urge an expansion in several ways. Government regulations might be used to encourage investment of the money in an additional ship or two, or they might get a chance to acquire controlling interest in an entire shipping company. Now at this point it gets tricky, for the referee will have trouble controlling the campaign if the players decide to split up and conduct the trading in person. They should be encouraged, instead, to run the business from an established headquarters, and let individual ships make their own runs and turn over the profits. The referee can set up and administer the operations of a shipping line without a great deal of trouble, once it's established what worlds are being serviced, what ships are employed, what competitors are involved, and so forth. Each month, the players can be presented with a profit and loss statement to let them know how their little company is doing.

It might seem that this is the interstellar equivalent of the famous "shoe store" adventure (roll 1D for number of customers, each one buys a pair on a 7+) not the most inspiring campaign! However, this can be a starting point for some great adventures, which can lead to "accidental" adventures (crash-landings on strange worlds, etc.).

In *The Traveller Adventure,* Oberlindes Lines is in such a situation. As the company expands into a new subsector, they face competition (and some violence) from Tukera Lines, a rival of considerable power. This sort of situation spawned the excellent short stories (and a couple of novels) about Nicholas van Rijn, by Poul Anderson. Van Rijn has risen to the top of a powerful trading company—but that doesn't mean he spends all his time

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The BESTIARY

Afeahyalhtow
(Aculeoptera venator)

A life-form native to Kuzu, homeworld of the Aslan, the afeahyalhtow (known to humans as the batsting, winger, or falconbat) was domesticated by Aslan hunters long before the race first achieved star flight. They are popular as pets, and are found almost anywhere Aslan are found. Afeahyalhtow are roughly as common in Aslan space as dogs, cats, and other pets are in the Imperium, and regarded by the Aslan in much the same way.

The afeahyalhtow is a carnivore/killer, distantly related to the Aslan in evolutionary terms (the relationship is roughly equivalent to that between humans and bats on earth). Like the Terrestrial bat or the Macropan screamer-in-the-darkness, the creature is a flyer, massing roughly 1 kg, and with a wingspan of about .75 meters. The lower limbs have evolved as grasping claws to carry prey or perch on tree limbs or high rocks.

Wingers have sharp eyesight, with cat-like eyes that can adjust to a wide range of lighting conditions. Their common practice is to soar at high altitudes, then swoop down on prey. The creatures' grasping claws include one sharp, specialized claw which can inject a paralyzing poison which does 10 points of damage within a few minutes of injection. The poison's effects wear off after about an hour (whereupon the damage is recovered). The venom is not usually harmful to any creature much larger than 5 kgs, but can be deadly to humans who develop an allergic reaction to it. The primary purpose of the poison is to slow the prey or render it unconscious, so the afeahyalhtow can feed (it prefers live meat). Teeth and claws only do 2 points of damage per round, but this is sufficient to allow the

afeahyalhtow to make an excellent meal, feeding for 2D+6 rounds before departing.

Domesticated afeahyalhtow are raised and trained much as falcons and garhawks in human space. Properly trained, they can be used to track and hunt prey; such trained hunters will administer poison to the prey, but will feed only when permitted to do so by their owner. They are easily cared for, eating almost any variety of small animals or, if necessary, raw meat of almost any sort.

Training of an afeahyalhtow takes a minimum of hunting-2 skill and 6-12 months before the animal will respond to commands (usually various whistle and tongue-clicking signals). A character who has any hunting skill at all and who has worked with afeahyalhtow (Aslan characters with hunting skill have this experience on a 6+, humans on 12+), will gain an extra level of hunting skill while using the animals on the hunt.

Despite their feeding habits, which most humans find distasteful, afeahyalhtow are relatively gentle, companionable pets. They are frequently likened to cats in their behavior — independent, somewhat aloof, but capable of a strong affection and attachment to individuals who understand their ways.

Afeahyalhtow do not respond well to being caged; most grow listless and lose any hunting spirit if confined for more than a few days (roll 10+ once per week to avoid such an outcome). Afeahyalhtow will eventually die in close confinement. Most owners let them fly free, first attaching small straps around their feet to prevent the stinger claw from functioning. On a starship, they usually require an hour or two per day of flying time in the ship's cargo compartment or some other open space.

Afeahyalhtow can fly on any world with standard or dense atmospheres and in any thin atmosphere where the world size is 4 or less. Because of their size and build, they cannot be provided with any sort of protective gear which will allow them to fly, and so are rarely encountered on worlds with tainted or otherwise unbreathable amospheres, except indoors, in conditioned quarters.

Afeahyalhtow are not common in human space (except on worlds heavily settled by Aslan colonists), though some humans do keep them as pets. They command high prices commercially. *(Editor's Note: For further information, see the* Small Cargoes *column in this issue, which discusses transport for these animals.)*

— John Marshal

Ponsonby's Velvet

(unclassified)

Ponsonby's Velvet is a quasi-fungal plant native to Ponsonby Beta, a sparsely colonized world of the Solomani Rim, off the jump routes, and most charts. The colonists, who prefer to live without high technology, prefer their isolation, but maintain a class E starport which sees occasional landings.

Ponsonby's velvet hangs in sheets from the local "trees," rather like terrestrial Spanish Moss. The plant resembles a heavy and very rich velvet cloth, with an attractive sheen; the host tree seems to be hung with tapestries (on Ponsonby, Velvet is sometimes referred to as the "Rich Banner Plant"). It is as strong as cloth; and since it grows free for the taking, Ponsonby's colonists

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Animal	*Weight*	*Hits*	*Armor*	*Wounds & Weapons*	
Afeahyakhtow	1 kg	5/0	none	2 see text	A4 F9 S3

Casual Encounter:

Ex-Navy Captain
Gamaagin Kaashukiin 798AAC Age 38 5 terms Cr60,000
Pilot-4, Ship's Boat-3, Ship Tactics-3, Handgun-3, Leader-2, Navigation-2, Survival-1, Vacc Suit-1, Sword, Travellers',
Awards and Decorations: 3 MCUF, 2 MCG, 4 combat service ribbons, 10 command ribbons.

Gamaagin Kaashukiin, heir to the Barony of Klavos on Adabicci/Lunion, served with distinction in the Imperial Navy. An honors graduate from the Lunion Naval Academy, she went on to flight school, serving several years as a fighter pilot aboard the frontier Cruiser *Children of the Marches.* Eventually, she transferred to a Line post, and held a variety of commands, mostly small ships in the 400-2000 ton range.

Shortly before the war began, her

father died, leaving her the Barony of Klavos. Gamaagin resigned her commission to go home to her new fief and oversee the transition. While there, she met, fell in love with, and became engaged to Simon, Baron Dacres.

However, only weeks before the scheduled wedding, as Dacres was returning to Adabicci from business in Tenalphi, the war broke out. The liner on which Dacres was travelling was ambushed by a Sword Worlds commerce raider, the 800-ton commerce raider *Excalibur.* Although the liner surrendered, Dacres attempted to organize a resistance to the boarding party, and was killed. Other passengers and crew were set adrift in a small boat; on being rescued, they passed on the story.

Gamaagin was horror-struck at the death of her fiance. After days of mourning, still in shock over the incident, bitter thoughts of vengeance began to stir within her. She resolved to do everything in her power to avenge herself against the Sword Worlders who had ruined her life. Baroness Klavos decided to return to active duty. To raise money for a ship, Gamaagin was forced to sell the Klavos fief (the family fortune was far from sufficient for her needs). No longer Baroness Klavos, she was (once again) Captain Kaashukiin, commanding a *Broadsword*-class mercenary cruiser purchased from a defunct mercenary outfit. Originally the *Boomerang,* the ship was re-named *Retribution* by Kaashukiin. Using old contacts in the Imperial Navy, she arranged to have her ship and crew hired as mercenaries, and began a campaign of raiding along the Sword Worlds frontier.

Adventurers can run into Captain Kaashukiin in several ways. The most obvious is for her to become an employer or patron. *Retribution* is usually in need of crew members (former army and marine personnel for her marine complement, navy or scout veterans for the command crew, even merchants to act as prize agents, supply officers, etc.).

Kaashukiin will be interested in groups of adventurers with their own vessels. Armed starships might be added to give her a flotilla, rather than a single ship; merchantmen might be approached to act as decoys to set up an ambush of Sword Worlds commerce raiders.

She can also be introduced, if the referee desires, as a potential employee. If *Retribution* were lost by accident or in combat, but her captain survived, Kaashukiin might be willing to hire out as a pilot until she can recoup her losses and get a fresh chance to seek her goal.

Kaashukiin is a skilled naval officer, highly competent, and very capable. She tends, however, to be blinded by her desire for vengeance. Her main goal in life is to find the *Excalibur,* and she will forsake all else to do this. Her crew, hired on for shares of the proceeds from prizes taken, do not like the occasional diversions to follow up a rumor of the enemy raider, but they have tolerated her eccentricities so far because her voyages pay well.

Adventure situations involving Kaashukiin's hunt for *Excalibur* are numerous. Ordinary operations (attacks on Sword World merchant shipping, raids against isolated outposts, deep penetrations of occupied territory, etc.) are a good source for excitement. Crew discontent at passing up some particularly lucrative prize could lead to a mutiny, with adventurers having to choose between the two sides. An adventuring group might be among the personnel assigned as prize crew to a captured ship, with the task of navigating it back to a friendly class A starport for sale of ship and cargo, the bread-and-butter of this sort of operation. Such a voyage is, of course, fraught with danger: Sword

Continued on page 45

AMBER ZONE:

Raid on Stataorlai

Players' Information

Stataorlai (C-0007J8-8) is an asteroid belt located in 0605 of the Kyaenkha subsector of the Dark Nebula sector, controlled by the Eakhtawa clan. The Eakhtawa are allies of a powerful clan which controls a great deal of territory both inside and beyond the subsector, the Aeahekihiykhiy. Recently, a clan war broke out between this clan and their rivals, the Hweaolriya clan. Though the Eakhtawa have remained officially neutral in the dispute, they are known to favor the Aeahekihiykhiy.

The adventurers are a band of Aslan characters belonging to the Hweaolriya clan (the pregenerated characters included in the Aslan module will do very well). While on Waeoisya, a world which is split between a number of different clans (including both Hweaolriya and Aeahekihiykhiy), they are recruited by a local clan leader to carry out a mission of great importance to the clan.

It is believed that the Aeahekihiykhiy are preparing to stage a military assault against the Hweaolriya lands on Waeoisya, designed to seize territory as a bargaining counter to offset Aeahekihiykhiy losses elsewhere. Hweaolriya intelligence officers are convinced of this, due to various bits of intercepted information, but there has been no evidence of major troop or supply build-ups in any accessible Aeahekihiykhiy territory within striking range of Waeoisya.

The only way that a strike could be launched would be from an unexpected location ... such as a system belonging to an ally which is willing to allow supplies and forces to build up. The Stataorlai belt is a prime candidate for such a system.

The clan leadership desires the adventurers to slip into the Stataorlai system undetected and see if they can discover evidence of Aeahekihiykhiy activity there. It is a mission that requires careful handling, for the Hweaolriya do not wish to offend the system's owners, the Eakhtawa, if nothing is actually going on.

Hostile action must be kept to a minimum, and directed only at Aeahekihiykhiy personnel (except in strict self-defense), since the Hweaolriya and the Eakhtawa are not yet at war. Word of a buildup must be brought back to Waeoisya if it is occurring, so that action may be taken.

The adventurers will be provided with a ship of appropriate size and type to go with their numbers and mission (armed Aslan scouts, traders, or couriers are the most likely candidates). Other equipment appropriate to the mission will also be provided.

Referee's Information

The adventurers can jump to the Stataorlai system in such a way as to escape detection (aiming for a point well beyond the normally travelled parts of the system). There are three gas giants from which wilderness refuelling is available; the innermost is large (105,000 km in diameter), while the outer two are each under 50,000 km. There is an Eakhtawa clan military base on one of the inner giant's moons; if refuelling is attempted here, the adventurers will be detected on a 4+, and two Aslan escorts sent to investigate (and if necessary, destroy) the intruder. Chances of discovery are much slimmer at the outer gas giants; 10+ is needed for the discovery in each case. Refuelling would permit a fast getaway at need.

To conduct their investigations, the adventurers must lie low, monitoring communications and other activities to see if there are any anamolies worth investigating. Roll 8+ once each week (five Aslan days) to determine if a significant encounter occurs; if it does, roll on the appropriate starship encounter table. If this second roll yields a ship encounter, the adventurers are noticed by the ship in question (which is Eakhtawa, and *always* hostile; resolve the encounter in accordance with the responses of the players, using starship encounter rules if desired.

Should the second roll not bring about a ship encounter, some unusual communications activity is noticed at the trailing trojan asteroid cluster in the orbit of the inner gas giant. The first time such activity is noted, it is merely noticed that there is considerable traffic in the region, which is not a major population center or resource exploitation area of the system. Players may choose to investigate more closely, or to file the data and await further information. In the latter case, the second result which points to the trailing trojan cloud is a signal which can be recognized as an Aeahekihiykhiy battle code. The coded message itself cannot be understood, but the code itself is quite familiar to any adventurer with a military background (particularly female staff officers). The same fragment of coded communications will be picked up if the adventurers move straight in to investigate.

Such an investigation will reveal that there are, indeed, a number of ships and vessels within the cluster, and several installations built on various small asteroids. These are plainly military posts and transport vessels. However, their transponders identify them as belonging to the Eakhtawa clan. While circumstances may convince the adventurers that this is the Aeahekihiykhiy build-up they were sent to find, there is no real *proof* (for the coded message might have been a mistaken identification, or just proof that the Eakhtawa are employing an ally's codes for one reason or another). Since at least one option under consideration on Waeoisya is a preemptive strike against the Aeahekihiykhiy attackers before their own strike could be mounted, proof must be positive to avoid either an ur

fortunate incident or a failure to act when action is necessary.

Such proof can be most readily obtained by getting onto one of the ships or installations and obtaining access to computer records which would show the true nature of the trailing trojan activity. A ship would be easiest (and, in an emergency, could be stolen and flown back to Waeoisya if trouble arose). It should again be impressed upon the players that, first, they must not allow their actions to be connected with the Hweaolriya clan, and secondly, they should not kill or seriously injure neutral Eakhtawa clansmen. This means they must be extremely circumspect about too violent an attack until they have established for certain the actual ownership of the ships and installations in the trailing trojan cluster.

The referee should arrange for an Aslan 400 ton trader or similar ship to lay itself open to any type of ambush the adventurers may devise. The ship will be carrying its standard crew complement, plus gunners, and will be armed (the referee can determine the exact armaments). Plans made by the adventurers and the flow of events regulated by the referee will bring events to a conclusion.

Should the target vessel be taken, it will indeed prove to be Aeahekihiykhiy, disguised to forestall would-be intelligence operations of the sort the adventurers have been engaging in. The computer logs on board can prove this, and will permit the defenders on Waeoisya to parry the incoming attack most effectively.

Play of this Amber Zone requires that the referee and players have access to the Aslan module.

— *Keith Douglass*

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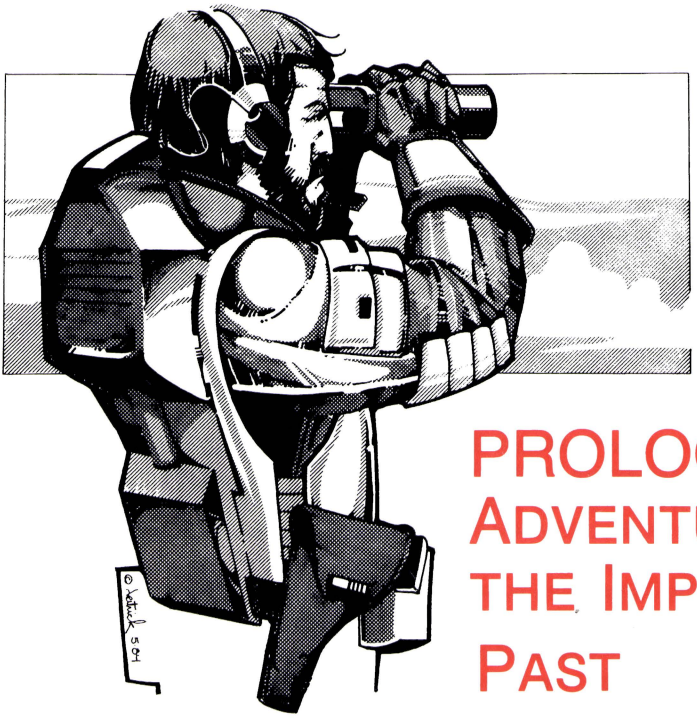

PROLOGUE: ADVENTURES IN THE IMPERIUM'S PAST

Many players and referees find the GDW universe restrictive of certain types of adventures. These people find the Third Imperium (and its neighbors) too settled, too civilized, too . . . familiar. They yearn for the thrill of landing on a world for the first time . . . of being the first to describe a world . . . of making first contact with an alien race. All of these things are difficult (but not impossible) if you want to stick with GDW's official universe. To be sure, there are frontier regions, but these are the static frontiers of a long-established, stable government, not the growing borders of a dynamic, expanding culture. Many others find the high tech level of the Third Imperium a problem. It is too easy for the players to use equipment instead of thinking to get them out of tight spots, too easy to just blast whatever bothers you. However, few referees (and few players, for that matter) care to abandon our maps and our background history. I have a simple solution to this dilemma: Backdate your **Traveller** campaign.

THE FUTURE'S PAST

The whole thing is very simple. Instead of setting your campaign in 1110 (the "present"), set it in some previous time period, when the Imperium was smaller (or non-existent), when tech levels were lower, when there was a universe to explore. By picking the proper era, referees can make use of most of the same materials as before (the maps especially). There is no problem with the rules if this is done—the rules are not universe specific, indeed, they were designed to allow considerable freedom in background choice.

Backdating will require some work on the part of the referee (there's no such thing as a free lunch), but it isn't too bad if you plan ahead. In fact, it is no more difficult (it can be a good deal *less* dif-

ficult) than the work many referees already do to create a campaign.

If you set the campaign in an unpublished sector, you need merely generate worlds normally, setting a ceiling on tech levels (what this ceiling is depends on when the campaign is set). What interstellar government there is (if there is any at all) depends on where and when the campaign is set. Most worlds before the coming of the Third Imperium were either independent, or members of small confederations or petty empires. Very little material on the pre-Imperial governments of most sectors have appeared, so referees have a free hand most of the time.

Tech level ceilings for various worlds will have to be extrapolated from information available. It is known for instance, that the Imperium was at tech level 14 during the Solomani Rim War, and that the Solomani Confederation was able to get some tech 14 equipment, but was equipped mostly with tech 13 (*Invasion Earth).* Likewise, Terra developed jump-3 drives between −2400 and −2235 (*Library Data N-Z)* and probably managed to retain at least tech level 9 throughout most of the Long Night (see *Solomani Rim)* Exactly who gets what tech level when is a very complex question. Some worlds may be artificially high because of their own efforts. Some will be raised by trade with other worlds. Some may remain technological backwaters because of their location. Settlement patterns are also of great importance. A world which was settled 500 years before another has a jump on technology, all other things being equal. Worlds with native races may be a leg up on technological development. Some worlds may luck onto the remains of a dead civilization several levels higher than they are, and advance by studying the remains.

In published sectors (such as the Spinward Marches or the Solomani Rim) more of the pre-Imperial history has been described, but much of it has yet to be detailed. I'll talk about these sectors later.

There are, however, a few problems connected with backdating (or with starting any new campaign while an old one is in progress).

The first is player resistance. Players (naturally enough) will be reluctant to abandon their characters and those characters' possessions and skills. The obvious solution is to wait until a campaign has run its course, and start a new one, in the new time. Most campaigns eventually reach a stage where they become over-familiar, and can be abandoned without too many regrets on the part of the players.

A second solution to player resistance is to run two campaigns. This way the players get to keep their "old" characters and get the thrill of "new" characters at the same time.

Doing two campaigns at the same time is a rough go, however, and most referees would be well advised to alternate adventures from one to the other. Run the "modern" campaign for a few sessions, then (when a natural break comes in the action) switch to the "historical" campaign.

The second problem is, what if the players do something in their previous "incarnation" that radically changes the nature of the "present." The simple solution to this problem is to declare that the two time periods belong to separate, parallel universes, and what is done in one has no effect upon the other. All of this assumes, of course, that the referee is concerned about being able to use the GDW material on the present.

SPINWARD MARCHES

The Spinward Marches is, in many ways, the best suited for this sort of

treatment. The settlement patterns and dates of colonization of the Spinward Marches are given in the *History of the Spinward Marches* essay in Supplement 11, *Library Data N-Z.*

Little information is available on tech level progression in the Marches. The Darrians (see *The Darrians, Journal* #14) are known to have achieved TL 3 by the time of their contact by Terran traders in −1511, and had achieved the ability to construct jump drives by −1137. They reached TL 16 for a time, but their civilization was wiped out by a disastrous series of solar flares in −924, and it was −271 before they regained the ability to construct interstellar vessels.

The Sword Worlds were colonized by Solomani exiles, and must have had jump drives when they arrived, therefore they begin at 9 or 10 in −400. Further details of their history can be found in the *Contact* article covering them in *Journal* 14. Bear in mind that their technological development has advanced and receded at various times because of the almost incessant wars in the region.

The Traveller Adventure gives a basic history of the Aramis subsector, *Tarsus* and *BeltStrike* detail District 268.

SOLOMANI RIM

An obvious temptation is to game out the expansion from earth in the late twentieth century. There are a few problems connected with this, however. The tech level of the Earth at the time is not hard to determine (TL 9, in fact), but the schedule of settlement of the worlds of the Solomani Rim has not yet been worked out in detail. If you're willing to work around this little ambiguity, by all means, proceed. I would prefer to set a campaign a little later, around the time of the interstellar wars, during one of the "lulls" between the fighting, when the plucky Terrans are building hegemony in the stars, taking over deserted Vilani outposts, and so on.

Supplement 8, *Library Data N-Z,* Supplement 10, *The Solomani Rim,* and Supplement 11, *Library Data, N-Z* will provide much of the necessary data.

INVASION EARTH

Another exciting period (involving the Solomani Sphere, but not necessarily limited to the Solomani Rim) is the period of the Solomani Rim War (990-1002). Those of you who are unreconstructed Solomani sympathizers might wish to try your hand at keeping the home of mankind free from Imperial domination (in a parallel universe, of course). GDW's game *Invasion Earth* contains enough material to provide the basics of this campaign background (also consult the references given for the Solomani Rim).

Whatever you do, have fun!

— *Loren K. Wiseman*

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Continued from page 19

ning parallel to the equator) are at 10° to the hex, rather than 8° (thanks to the inevitable distortions which accompany any mapping process of this sort). This allows the major area of interest—the twilight band—to be mapped in greater detail than would otherwise be possible. Double Adventure 2, *Across the Brightface* makes use of this mapping convention quite effectively.

— *J. Andrew Keith*

Continued from page 25

have made it their principal clothing material. Natural colors range from a pale tan (the commonest) to a deep green and a blood red (the most prized). Velvet may be colored with vegetable dyes, but synthetic dyes will poison the plant, causing it to disintegrate.

While Ponsonby does not trade actively with other worlds, velvet clothing sometimes finds its way off-world, usually single items bartered for by starship crewmembers.

All of which leads to a problem. Velvet reproduces by spores, which form on the surface of the plant and drop away to be blown by the wind. The spore clusters resemble lint, and a person unfamiliar with the plant may assume they *are* lint. if a spore lands where food is available, it will grow. And velvet can use just about any organic-carbon molecule as food. That includes bearing lubricants, garbage, and petrochemical fuels. Imagine a rag stuffed into your car's intake manifold (fortunately, the clusters are too large to be readily inhaled, and if ingested, digestive fluids will destroy them).

The velvet normally sporulates in Ponsonby's spring season, but exposure to varied environments (as when space travelling) may alter the cycle. A garment may "go lint" at any time.

Enough Ponsonby clothing will eventually enter circulation for the authorities to become aware of the hazard; for now, it is too rare to require action.

— ©1984, John M. Ford

Continued from page 23

behind a desk. Drawing on these sources, a whole new level of adventuring is possible. It means you need not remain forever attached to the party of wandering adventurers, taking odd jobs and scratching for a living.The players can be rewarded, and yet *still* continue their adventuring careers.

This last is important. If you want to keep up player interest, you must keep up player *involvement* as well. Look to new horizons, offer new challenges, and your adventures will be successful ones.

J. Andrew Keith

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Small Cargos:

Afeahyakhtow

Cargo: Afeahyakhtow
Lots: 1 kilogram each
Value: Hierate space, Cr250 each. Human space, Cr5000 each.
Transport Price: Cr 15 each week.
Transport cost: Cr5 each per week.
Market: Luxury item, Restriction 0.
Availability: Hierate space, 5+. Human space, 11+.
Special Handling: Live animal. Cannot be shipped in low berth. Special feeding requirements. Poisonous.

Players' Information

The Afeahyakhtow is a flying animal (see this issue's *Bestiary)* commonly found in the Aslan Hierate. Domesticated by the Aslan, they are used as hunting animals (much like falcons on earth). They vaguely resemble terrestrial bats in appearance, but are equipped with stinger-like dewclaws which inject a poison which can cause a victim to become sluggish, pass out, and sometimes die. Most Aslan nobles prize the animals as pets, as do some humans.

Referee's Information

In the event Afeahyakhtow are located as a cargo, roll 1 die per animal purchased and implement the following according to the die roll:

1. The Afeahyakhtow proves to have been poorly or improperly trained. Attempts to feed it result in attacks by the animal. Luckily, the animals poison claw has been hobbled. Still, characters will suffer 1D attacks when attempting to feed the animal (which must be done

twice a day); successful attacks cause 2 points damage from teeth and (non-poisonous) claws.

2. As 1, but at each feeding, a roll of 10+ indicates that the Afeahyakhtow has managed to slip its hobbles and free or both poison claws. If this happens, the first successful attack results in 10 points damage (applied to strength) from poison; the animal will then attempt to feed.

3. The Afeahyakhtow proves highly susceptible to confinement, even when excercised in the comparatively spacious confines of the ship's hold. On a roll of 9 or less, it sickens and dies. The captain of the ship may be held liable for the value of the animal.

4-6. No special problems occur.

— *John Marshal*

Hkyadwaeh

Cargo: Hkyadwaeh
Lots: 10 kilograms each.
Value: Cr75 per lot.
Transport Price: Cr4 per lot.
Transport Cost: None.
Market: Aslan worlds — luxury item. Restrictions +3.
Availability: In Hierate space, 5+; outside Hierate space, 9+.
Special Handling: None.

Players' Information

Hkyadwaeh (known to humans as Bitter-root tea, after its taste, or Mules-kick tea, after its observed effect on Aslan who drink it) is a beverage brewed from the roots of the hkyao plant, a fairly common shrub found on several worlds of the Hierate (most notably Kualakhtaea in the Kyaeakha sector). Humans find the beverage (made by steeping dried roots in boiling water) rather bitter and most unpalatable, though there are a few individuals who have learned to drink it without betraying their distaste. Among the Aslan, however, the drink is exceedingly popular. It is mildly intoxicating (about as strong as beer or ale on a human system), and far preferred by the Aslan over alcohol. There exist a large number of specific blends and brews, and Aslan connoisseurs choose between them with the discretion of a human wine expert. Virtually no market exists outside of the Heirate, except among non-Hierate Aslan, but the beverage is a common cargo within Heirate space.

Referee's Information

In the event a cargo of Hkyadwaeh is located as a cargo, roll 1 die per lot purchased and implement the following according to the die roll:

1-2 The shipment proves to be of inferior quality. If the player characters own it, an additional DM-4 is applied with all other modifiers for resale value. If they are merely transporting it for another, there is no ill-efect, save that the recipient may not be particularly interested in doing business with the adventurers after tasting the product.

3. The shipment proves to be of superior quality. The resale value has an additional DM+2 applied, if the player characters are dealing with it themselves. If they are transporting it for another, the recipient will regard them with a reaction DM+1, and if the players are themselves Aslan, may make a gift of one lot to them for their personal use (which they may use for a reaction DM+1 on other Aslan to whom they serve it later).

4. As 3, with the addition that the shipment attracts the attention of a hostile clan or renegade group looking to hijack the shipment. The referee should create and resolve appropriate encounters as desired.

5-6. The shipment poses no special or unusual concerns.

— *John Marshal*

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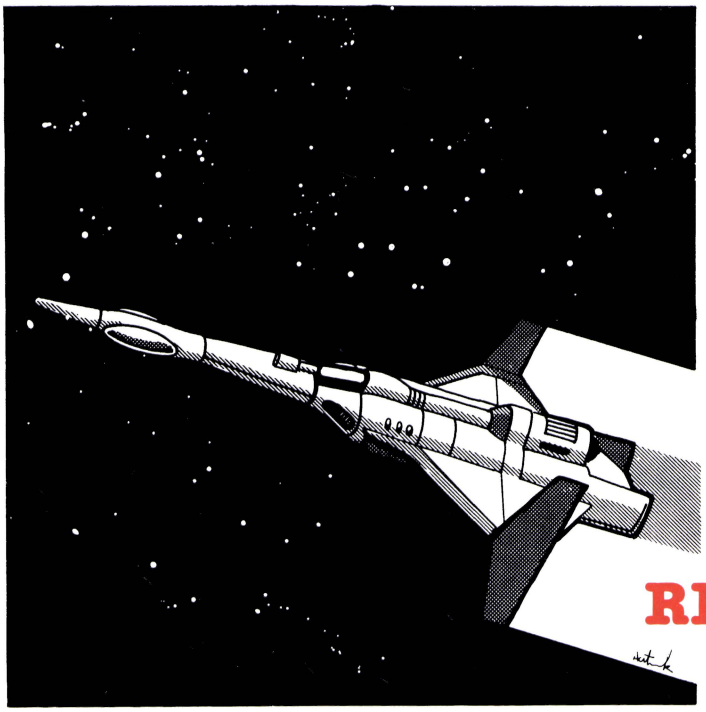


Spinal Mounts REVISITED

Editor's Note: This article is presented for those who might be interested in the facts behind some **Traveller** *equipment. Please note that some of the weapons Mr. Cumber mentions are not included in* **Traveller** *(the A-PAWS in particular). Referees who wish to adapt the A-PAWS into their campaign should exercise restraint, since the weapons mentioned here could have serious effects on the play of the game.*

Having read Dave Emigh's article, *Charged Particle Accelerator Weapons* (*Journal* #13, page 6), I felt that some up-dating would be in order. Mr. Emigh (toward whom I hold no personal animosity: in fact, I've never met the man), for all his brilliant exposition, made several technical errors. I am sure these were unintentional, and caused by either lack of detailed expertise in the area, or by the constraints of a security clearance. Fortunately, I am not hampered by a clearance, and I have been researching the subject for quite some time, both as a personal interest, and in my line of work (from January until May of 1983, I was assistant to the director of High Frontier, a non-profit educational entity involved in Ballistic Missile Defense (BMD) issues, and we kept a close eye on particle beam research).

BASICS

There are two basic kinds of **Traveller** spinal mount weapon: the particle accelerator and the meson gun. This conforms to the real life situation (at least as far as it goes). The particle accelerator can be further subdivided into the Charged-Particle Accelerator Weapon System (C-PAWS) and the Neutral-Particle Accelerator Weapon System (N-PAWS). The operational differences between C-PAWS and N-PAWS are of significant importance to **Traveller**/*High*

Guard ship design.

Little needs be said about the meson accelerator (Meson Gun) except that it is already being tested in medical labs as a new method of destroying cancer cells in humans! By firing mesons into a tumor, their internal explosion is reported to be highly successful at destroying cancerous cells while leaving the surrounding tissues undamaged. Unfortunately, even the very small Meson Guns used in medical research are incredibly expensive. Only higher power levels (and thus, size and expense) prevent meson guns from being viable weapons in the 1980s.

The particle accelerator is being developed by both the Soviet Union and the United States, and deployment of such weapons by one or both nations is expected before the end of the 1980s. Such a weapon has been described as producing huge, man-made lightning bolts (of *immense* power) when in operation. The C-PAWS accelerates a stream of high-speed, charged particles (either protons or electrons) toward its target. The N-PAWS uses advanced techniques to create a similar stream of high-speed, *chargeless,* neutrons for the same purpose. C-PAWS works perfectly well in the atmosphere, because atmospheric pressure acts to keep the beam of mutually repelling charged particles together. One method of controlling a C-PAWS beam in the atmosphere is to mount a high-powered laser above the muzzle of the weapon to provide a "guide beam" of less-dense heated air between C-PAWS and target so the particles can follow a "path of least resistance" to their objective. In the vacuum of space, however, the mutual repulsion of the charged particles makes the C-PAWS a *totally* ineffective weapon: the particles fan out as soon as they leave the muzzle of the weapon, just as if you turned the nozzle of a garden hose from a pencil-thin "rod" of water to a dispersed "mist" setting. The N-PAWS, on the other hand, suffers no such handicap in space, and is, in fact, ideal for such an environment. Whereas the C-PAWS works well in the atmosphere (but lousy in space), the neutron beam of the N-PAWS is absorbed and limited by the atmosphere (but is ideal in space).

Obviously, a **Traveller**/*High Guard* ship would be using an N-PAWS, and *not* a C-PAWS as its spinal mount particle accelerator. Meanwhile, a *Striker* point-defense particle accelerator (for operations in an atmosphere) would be a smaller and less expensive C-PAWS rather than an N-PAWS. According to the data presently available (early 1984) the Soviet C-PAWS experiments (which have been going on for several years) are using progressively shorter weapon lengths while the explosive-magneto-hydrodynamic (E-MHD) generators which power their C-PAWS have been reduced until one could fit in the back of a small truck and generate an extremely short pulse of truly awesome power. Unfortunately for the Soviets, they need a whole battery of them (firing in sequence) to create a sustained beam. The Betatron (electron-generating, negatively-charged C-PAWS) that the Soviets have at Sary Shagan (their ABM proving ground) was reported (as of over a year ago) to have accomplished over 25 successive, successful engagements of incoming ballistic missile warheads (as they reentered the upper atmosphere) over the last several years. The Soviets are presently building installations that appear to be C-PAWS sites. Meanwhile, Soviet work on a small N-PAWS (suitable for satellite deployment) seems headed for a late 1980s or early 1990s appearance.

The US is investigating charged-particle accelerator weapons for

point defense of ships against aircraft and cruise missiles and space-based N-PAWS for ballistic missile defense (BMD). The latest projections for an American C-PAWS predict an appearance no earlier than the late 1980s, while the date of the N-PAWS deployment is being pushed into the next century.

Unfortunately, when the target is carrying or is a nuclear weapon, N-PAWS has its own possible problems that could render it unsuitable for use against nuclear weapons or nuclear-armed vehicles. To understand this, it is necessary to know the general configuration and operation of modern nuclear weapons, as published in the unclassified literature.

The core of the modern nuclear weapon is the "subcritical" (or "lens-charge") atomic (or "fission") weapon, which acts as the initiator (or "primary") to the rest of the charge. The primary uses high explosives to squeeze a less-than-critical mass of Uranium-235 (U-235) or Plutonium-239 (Pu-239) until it becomes spontaneously "critical" and fissions. The first test of a "subcrit" was the "Trinity" test at White Sands in July of 1945, which had a yield of 19 Kilotons (Kt.). The second "subcrit" was the "Fat Man" bomb (22 Kt.) dropped on Nagasaki, ending World War II. Interestingly, the "Gun-type" (full critical mass) "Little Boy" bomb dropped on Hiroshima (12.5 Kt.) was *never tested* prior to its first operational use, so sure they were that it would work. When you consider that the "Little Boy" weighed 4,037 Kg. (8,900 lbs.) and "Fat Man" 4,899 Kg. (10,800 lbs.), it is obvious that the "subcrit" is more efficient (1 Kt. yield per 223 Kg. of weight vs. 1 Kt. per 323 Kg.) than the "gun-type" weapon. Since that time, all pure fission weapons have been of the "subcrit" type, and it was the passing of the secret of the "lens-charge" to the Soviets which was the basis of the famous Rosenberg Spy Trials. As of early 1984, fission weapons are mostly used as primaries for larger yield thermonuclear (fusion) weapons. In this aspect, the primary is packaged with Lithium Deutride or Tritium compounds which "fuel" the "secondary" thermonuclear reaction, and the fission weapon creates the tremendous radiation pressure necessary as the driving force for material compression that causes fusion to begin. If this much is covered by a relatively thin, neutron-reflective casing, the result is an "enhanced radiation" weapon, wherein 20% or less of the released energy comes from the primary and the rest from the secondary, which produces copious amounts of fast neutrons...thus the popular name: "Neutron Bomb". The Neutron Bomb is limited in its usefulness to yields below about 10 Kt., because certain complicated mechanics of energy distribution make blast and (especially) thermal effects radii expand much more rapidly than the radius of initial nuclear radiation, as the yield increases. If, however, you encase your neutron bomb in a jacket of natural U-238 (which can be made to fission ONLY from fast neutrons), the result is the modern thermonuclear weapon, in which 50% of the released energy comes from fission (primary + jacket) and 50% from the secondary. Most non-neutron "tactical" nuclear weapons and ALL "strategic" ones use this "three-stage" (or "Tri-F") approach: fission primary starts fusion which fissions the jacket. However, all this great power of nuclear weapons (and no one has discovered any upper limit on how large they can be, so long as you have the nuclear materials) is generated in only a few millionths of a second before the internal pressure of the exploding primary literally blows the weapon apart and stops the reaction

while limiting the yield. This rapid dispersal of the weapon by the explosion means that only a minute fraction of the total weapon mass is ever converted to energy in accordance with Einstein's famous formula:

$$E = mc^2$$

Where,

E = Energy (in ergs),

m = Mass (in grams),

c = Speed of Light (in Cm./Sec.)

Therefore,

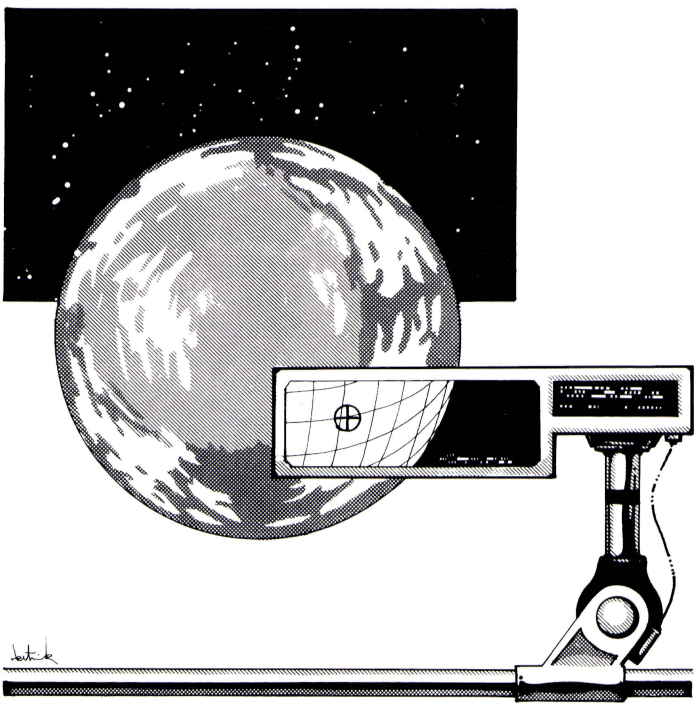
$c^2 = 8.987554306 \times 10^{20}$

Also,

1 Kt. of yield = 4.19×10^{19} ergs.

For example, the 100 Kt. warhead on the American "Trident I C-4" missile weighs approximately 57 kg., but only 4.66 *grams* of this (only 0.008%!) is actually converted to energy . . . and this is one of the more efficient weapons of the early 1980s.

If the high-speed neutrons generated by the N-PAWS strike the U-238 outer jacket of such a three-stage weapon (and this is one of the *smaller* "strategic" weapons!), will they cause the jacket to fission first and initiate the weapon in *reverse* order? If it does, would it result in a "Super-implosion" that *confines* rather than disperses the main mass of the weapon? Would such "trapping" of the mass result in conversion of enough of the weapon mass into energy to approach the theoretical "total conversion" explosion? *No one* knows, because such an experiment has never been attempted, but consider that the total conversion of our little 57 Kg. warhead would result in the creation of a small sun with a yield *exceeding* 1,222 megatons! By comparison, the largest man-made explosion to date (a Soviet nuclear test in October, 1961) was only 58 Megatons (Mt.), and the largest thermonuclear weapon in any nation's stockpile appears to be a Soviet 100 Mt.



warhead on the Model 3 (limited deployment) version of their largest ICBM, the RS-20 (NATO designation: SS-18). Using N-PAWS in this case could be a cure that is worse than the disease! The possibility of this problem should be proved or disproved *before* the N-PAWS is deployed in the BMD mode. Unfortunately, such a test may be very difficult to perform safely: even a weapon as small as 5 Kt. normal yield (which would weigh only about 8 Kg.), could produce over 165 Mt. if totally converted! Obviously, there is no way to safely test this underground, and the 1963 Test Ban Treaty prohibits such a test above ground (and who wants to be bunk-mate to a cosmic catastrophe anyway?!), so the only place left is in space (like, say, in orbit over the backside of the moon) . . . but the treaty banning nuclear tests in space has us boxed into a corner there.

A-PAWS

There is one kind of spinal mount weapon that the **Traveller**/*High Guard* system has yet to address: the Anti-Particle Accelerator Weapon System (A-PAWS). While this may appear to some as a really overpowering weapon, it could be realistically included in the game. Such a weapon could be available by Tech 15, since we are already both producing minute quantities of "anti-matter" and storing them for limited periods of time, such as the CERN Lab in Switzerland did back in the 1970s. Research in this area is moving ahead mostly because of anti-matter's potential as an energy storage medium, but more on that later.

The A-PAWS should appear no later than Tech 15, but should be handled in a slightly different fashion from the other spinal mounts. The first A-PAWS will be horrendously large, horrendously expensive, and will absorb energy like a Black Hole! After all, we are talking about generating enough anti-matter *very quickly* to be useful as a weapon, a procedure that will require large energy input and consequently heavier equipment to handle the power. This *severely* limits how A-PAWS are used to arm ships, and is a plausible reason for their appearance as shipboard weapons being delayed until Tech 15: while technologically feasible at earlier Tech levels, they would be too large to point as ground-based weapons and too expensive (both monetarily and energetically) for shipboard use, not to mention requiring a ship the size of the moon to carry and power only one such weapon. Each tech level reduces the cost, size, and required energy for the A-PAWS, as suggested in the following table:

SPINAL MOUNT ANTI-MATTER GUN

(USP Code "V" Particle Accelerator)

TL:	*Tonnage:*	*Cost (MCr):*	*Energy Points:*
15	200000	300000	3000
16	100000	150000	1500
17	50000	75000	700
18	20000	30000	500

You *cannot* use an A-PAWS in an atmosphere or while a ship is in an interstellar or interplanetary gas or dust cloud, because the anti-matter would react with the normal matter as soon as it left the vacuum of the weapon muzzle: a suicidal error! A-PAWS could be used *only* in ship-to-ship space combat (by generating chargeless anti-neutrons) and for planetary bombardment from high orbit. Such a weapon has *very* limited usefulness! Only a Black Globe can stop A-PAWS, and then only if it is "on" when the A-PAWS beam hits (roll higher than the "flicker" percentage to penetrate when the Globe is "flickering"; a fully englobed ship (always "on") is invulnerable to A-PAWS, and also

useless in combat). A "hit" on a non-globed ship (or penetration of a "flickering" Globe) is automatic vaporization, hence the name "V-Gun"!

Planetary bombardment would result in the equivalent of a large thermonuclear explosion at the impact point for each combat round the A-PAWS is fired. Before attacking the mass of the planet directly, one must first strip away the atmosphere. This results in a process more thorough but much lengthier than bombardment by nuclear missiles or other spinal mounts. To strip the atmosphere would require the equivalent of one combat round of A-PAWS fire for each hexagon on the planetary map over a period not exceeding that required for one ship to so bombard (see "World Maps for Travellers", *Journal* #16, page 6). For example, to strip the atmosphere from a planet whose map contains 144 hexes requires a total of 144 bombardment rounds. Obviously, if you have 12 ships armed with A-PAWS, you can have each ship bombard the planet for 12 combat rounds (during a total time span of no more than 144 combat rounds) to do the job. To "crack" the planet (destroy it by turning it into asteroids) would require additional rounds of bombardment equal to that required for atmosphere stripping, once the atmosphere is gone. Thus, our 144 hex planet would require 144 bombardment rounds of fire within 144 combat rounds to strip the atmosphere plus another 144 bombardment rounds (no limit on the time taken) to reduce it to asteroids, or a total of 24 bombardment rounds of fire from each ship in our exemplar 12 A-PAWS ship fleet.

The astute **Traveller** will note that the A-PAWS confers virtually no "defensive" advantage over ships armed with other types of spinal mount; indeed, if anything, it makes a ship so armed a "Priority 1" target of the enemy fleet. This is another aspect to consider before going A-PAWS crazy.

There is one other aspect of antimatter as a weapon that has not been previously mentioned: the use of antimatter as a form of nuclear warhead, but this is the subject of another article.

Jim Cumber

Continued from page 27

World ships attacking, battle damage on board causing a breakdown, prisoners attempting to retake the ship, and so on.

Finally, there is the possibility of confronting *Excalibur.* Like *Retribution,* she is an 800 ton mercenary cruiser. Basic game statistics are given in the *Starships* section of the **Traveller** rules; the two ships could be pitted against one another in a miniatures combat or resolved with *Mayday. High Guard* isn't as well-suited for resolving such a small-scale, ship-to-ship engagement, but its use is still possible, if your willing to ignore the problems.

Deck plans of the Broadsword-class ships are provided in Journal #8 and in Adventure 7, *Broadsword.* These could be used for the resolution of boarding actions or other engagements. Almost any other ship could be used as one of *Retribution*'s victims, and campaign possibilities revolving around this basic situation are almost endless.

Retribution and *Excalibur* are both standard Broadsword-class cruisers. *Retribution* carries two modular cutters, with a total of four modules on board: one personnel transport module (60 passengers), one fuel skimming module (28 tons of fuel), and two assault boat modules (16 troops each, fitted for combat landing operations).

Excalibur's cutters are fitted with personnel module, a fuel skimmer module, and two fighter frame module (as described in Adventure 7).

— *Keith Douglas*

Preparing a Commercial Traveller's Atlas

Published sectors, such as the *Spinward Marches,* fulfill a variety of generalized functions by indicating the location and characteristics of star systems in **Traveller**. They also provide the foundation for other play-aids to display additional useful information in a readily accessible form. One such aid is a specialized commercial atlas highlighting merchant-oriented data, and particularly the estimated profit of loss for any given interstellar route.

Such an atlas can be derived from the passenger and cargo tables in the Trade and Commerce rules. These tables readily yield the average potential revenue for any jump. By matching this figure against the known costs of travel, a ship's master can plot a course for maximum profit far ahead of his present location.

The modified passenger/cargo table which follows underlies all such calculations. In place of dice throws, the new table indicates the average number of passengers (by ticket-class) and tons of cargo which those dice throws will produce. Revenue per passenger or per ton is shown as well, reduced for passengers by the required life-support cost per occupied cabin or low berth. Fractional cargo tonnage has also been rounded down for simplicity. Modifiers for the population, technology, and travel classification have also been converted into passenger and tonnage equivalents (see table).

To calculate the average revenue for a given route, determine the population, tech level, and travel classification of the worlds of origin and destination:

1) note the base levels for each passenger class and for cargo on the table, based on the population of the world of origin;

2) modify these as indicated to reflect the characteristics of the destination world;

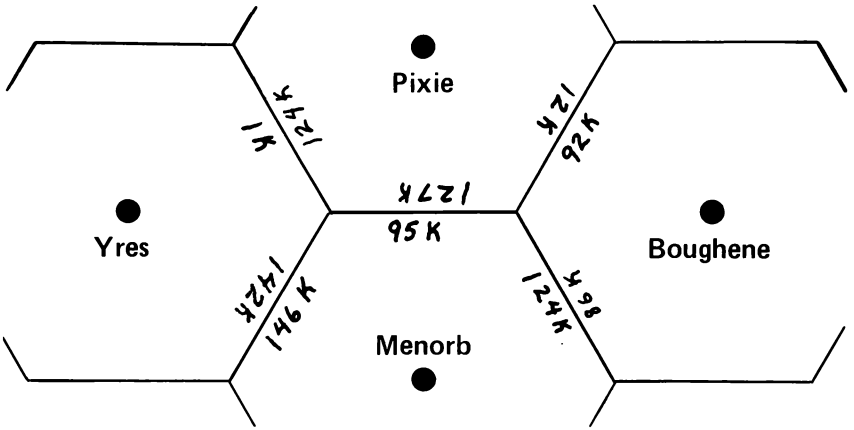
3) if necessary, reduce the total number of high, middle, and low passengers, and of tons of cargo to match the cabin and hold capacity of the ship in use;

4) multiply the reduced figures by the level of "receipts" shown on the table, and add up these figures to get the average income for the route.

For example, an A1 free trader (6 passenger cabins, 20 low berths, 82 tons cargo) leaving Pixie/Regina (pop = 1, TL = 13) for Menorb (pop = 9, TL = 7) starts with a base level of no high passages, 1 1/2 middle passages, 1 low passage, and no cargo. Modifiers for Menorb's high population add 3 middle passages (but no high passages due to the indication of "n/a") and 52 tons of cargo. Modifiers for Menorb's lower tech level add an additional 6 middle and low passages, and 312 tons of cargo (that is, 52 tons times 6 tech levels). The modified levels are thus 0 high passages, 10 1/2 middle passages, 10 low passages, and 364 tons of cargo. The A1 can accept only 6 middle passages, all 10 low passages, and only 82 tons of cargo. Average revenues for the run will therefore be (6 x 6000) + (10 x 900) + (82 x 1000) = Cr127,000. With normal expenses per jump of approximately Cr112,000 (Cr15,500 for crew salaries and life-support, Cr80,000 to the bank, Cr1500 toward maintenance and Cr15,000 for refined fuel), the average A1 free trader should clear Cr15,000 on an average run from Pixie

to Menorb.

Preparing a commercial atlas simply involves recording these average values on subsector maps. The estimate for each route's income can be written on the inside of the hex-side leading to the destination world. A completed free trader's atlas for the system cluster around Pixie would be as follows, with indicated in kilo-credits (KCr):



Base Levels of Passengers and Cargo

	———Available at World of Origin———			
World Pop:	*H. Passage:*	*M. Passage:*	*L. Passage:*	*Total Cargo:*
0	n/a	n/a	n/a	n/a
1	n/a	1.5	1	0
2	0	3.5	7	78
3	0	3.5	7	138
4	3.5	3.5	7	183
5	3.5	3.5	7	420
6	3.5	3.5	10.5	472
7	3.5	7	10.5	525
8	7	7	14	577
9	7	10	17.5	630
A	10	14	21	682
Receipts	KCr8	KCr6	KCr.9	KCr1

per ton or per passenger.

Modifiers for Destination World

—If population 4 –, subtract 3 from each passenger class and 210 tons from cargo.
—If population 8 +, add 3 to each passenger class and 52 tons to cargo (unless n/a).
—If Red Zone, expect no passengers or cargo.
—If Amber Zone, subtract 6 from each passenger class and reduce cargo by 2/3.
Tech Level: Add (or subtract) 1 to/from each passenger class and 52 tons from cargo per difference in TL between origin and destination.

Other data can be added as desired: port class, availability of fuel, and so forth.

Note that most routes are *not* reciprocal. The return route Menorb—Pixie generates only KCr95, an average loss of Cr5000 even though the A1 will save Cr12,000 by buying unrefined fuel on Menorb. The round-trip Pixie—Menorb—Pixie will thus yield an average profit of only Cr10,000. The most profitable route in the cluster is Yres-to-Menorb-to-Yres, which produces KCr288 for an outlay of KCr212 (again including refined fuel only where available).

Note that a commercial atlas is valid only for a single class of ship, reflecting as it does the particular capacities of that design. However, variations in the expense of each jump can be readily absorbed, the expense level compared to the average income from the table can be adjusted to reflect fuel-skimming or reduced crew salaries as needed. A commercial atlas will give the merchant a general glimpse of his financial future along his intended path.

— *Steven Sowards*

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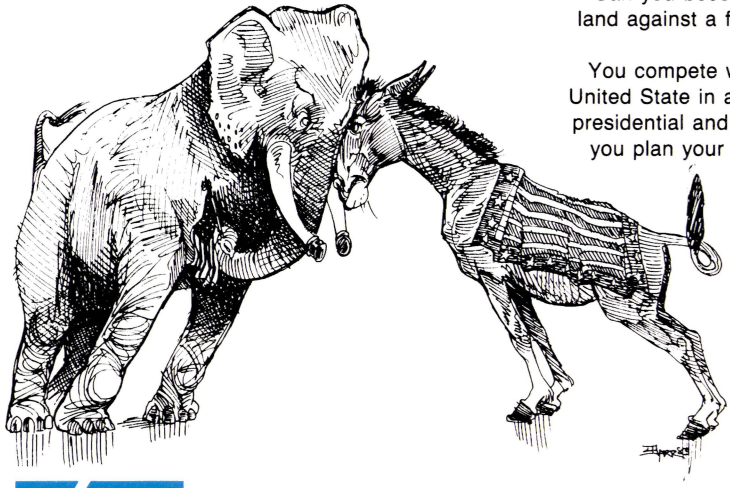

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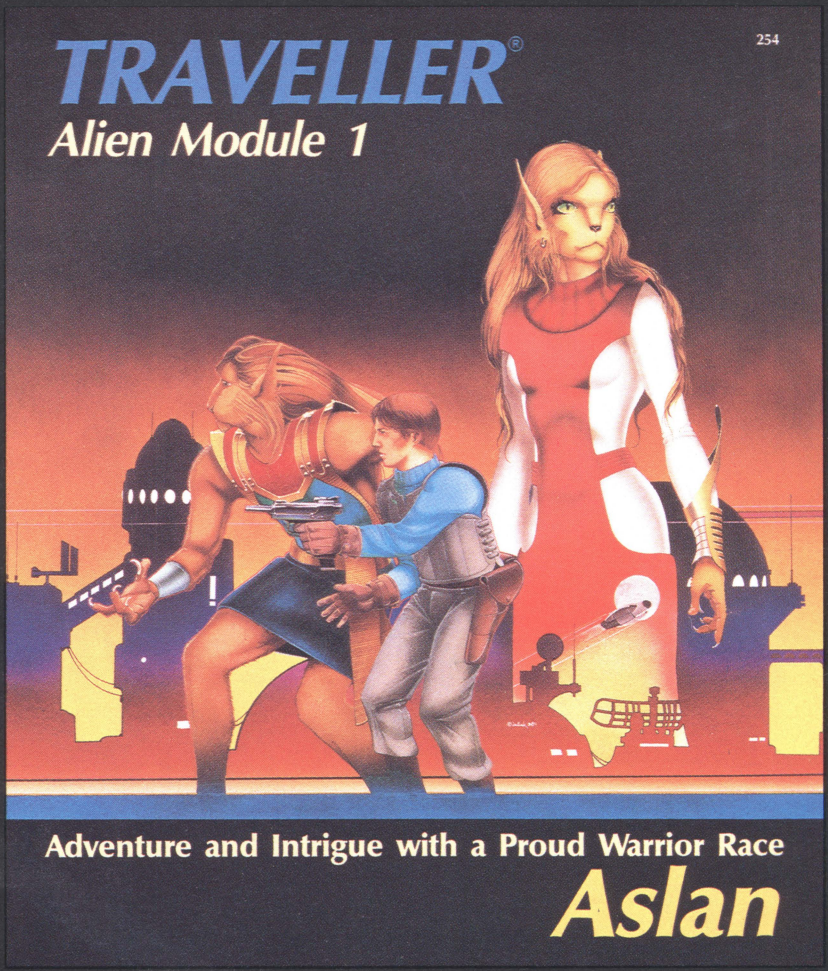

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